BANGALORE MOSQUITO CONTROL MASTER PLAN

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BANGALORE MOSQUITO CONTROL PROJECT
MASTER PLAN

Prepared by:

Dr. P.K. Rajagopalan	— Director.
Dr. P.K. Das	— Deputy Director.
Dr. M. Kalyanasundaram	— Senior Research Officer.
Dr. B.K. Tyagi	— Senior Research Officer.
Mr. N. Arunachalam	— Research Officer.
Mr. N. Somachary	— Technical Officer.
Mr. C.B.S. Reddy	— Technical Assistant.
Mr. C.M.R. Reddy	— Technical Assistant.

VECTOR CONTROL RESEARCH CENTRE
PONDICHERRY 605 006

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PREFACE

Bangalore city, known as the garden city, has been plagued by mosquito nuisance, though there is a good infrastructure for mosquito control and for which the Government has provided a budget of more than Rupees One Crore. The question of controlling mosquito menace in the city was first discussed during the Southern Regional Health Minister's Conference held at Pondicherry on 4th June 1983. At this meeting the salient features of the Pondicherry Project were explained by the then Hon'ble Health Minister of Pondicherry. *The success of the Pondicherry Project in achieving drastic reduction in mosquito density was not due to any new technological development but it was due to the systematic, concerted and coordinated approach adopted by Vector Control Research Centre through the application of already known techniques coupled with the will to succeed.* Impressed by the results of Pondicherry experiment, the Government of Karnataka, at the initiative of Mr. N.P. Singh, the then Health Secretary, invited the VCRC to study the problem of mosquito nuisance and prepare a master plan for control of mosquitoes in the Bangalore City. A preliminary discussion took place with the Hon'ble Chief Minister, Shri Ramakrishna Hegde, on 23.08.1983. Then the Chief Minister requested VCRC's assistance in controlling mosquitoes in the city, particularly in the airport area.

The VCRC established a small field unit in July 1985 and a time bound plan of action for gathering baseline data, assessing the problem and to prepare a master plan was initiated. Based on the already available information a macrolevel plan of operation was submitted as an interim report *on 10th January 1986*. This was circulated to all the High Power Committee members chaired by the Chief Secretary, for implementation. The VCRC also continued to monitor the implementation of the existing programme.

The Interim report was based mostly on the information collected by the Late Dr. T. R. Rao during 1975 and the data supplied by the Corporation officials. Since then Bangalore city had grown tremendously resulting in increase in the number of new residential areas which necessitated taking a fresh look at mosquito problem. Presently, the urban limit of the city of Bangalore is extended to 496.64 Sq.Km. which is also covered under the Urban Malaria Control Scheme. Thus a survey was conducted in all developed area of the Bangalore City Corporation (151.16 Sq.Km.), and in the peripheral area with a five Km. strip around the city so that an overall area of about 500 Sq.Km. could be covered.

However the time schedule for preparation of master plan could not be adhered to as *the facilities for carrying out such survey which were promised through a Government Order were not provided by the Directorate of Health Services.* In spite of lack of the necessary facilities, the VCRC carried out a detailed survey pressing its own manpower and accomplished the task of micro-level planning for the control of mosquitoes in the Bangalore Metropolis. The present master plan is obviously the first of its kind in the country which is so designed as to incorporate all essential mosquitogenic characteristics of a metropolitan city, the optimum use of the existing staff and finances for mosquito control and the measures to maintain a clean environment with better men and material management.

When the VCRC established the Bangalore Mosquito Control unit, it was planned that the VCRC would function in the Bangalore City, through its field unit, for a period of five years for achieving objectives of (i) preparing the master plan (ii) imparting training to the existing staff of the mosquito control programme, and (iii) monitoring the control operations subsequently. But it became apparent before long that the cooperation rendered by the concerned departments was not commensurate with the promises made and therefore it was felt that this goal would not be achieved easily. The administrative bottlenecks faced by the VCRC at every stage therefore forced VCRC to plunge into action on its own and go ahead with the preparation of the Master Plan within the shortest possible time and place it before the Karnataka Government to implement the pro-

gramme for the benefit of all. It is firmly believed that since the VCRC has now accomplished the task assigned by the Hon'ble Chief Minister, in spite of a number of constraints, the present Master Plan containing detailed informations on sources of mosquito breeding and methods of their control in the Bangalore Metropolitan city will be effectively implemented by the concerned authorities.

Dr. P. K. Rajagopalan
Director
Vector Control Research Centre
Pondicherry.

CHAPTER I

1. Introduction

Mosquito menace in the Bangalore metropolitan areas is causing serious threat to human health and comfort. *Culex quinquefasciatus* is the major man biting mosquito though several other species also cause nuisance from time to time. The programme of mosquito control at present followed is based on the routine application of larvicides, which is also not done regularly. Only when some complaints are received from VIPs some intensified and effective antimosquito measures were initiated and that too only in some places. Adulticidal measures like malathion fogging are also being carried out to control mosquitoes, which is more of a public relations exercise. The programme is not being implemented in an effective manner since no concerted effort has been made to improve the operational efficiency by enlisting the active participation of several agencies whose activities have resulted in creating mosquitogenic conditions.

1.1. Area: Mosquito control programme of Bangalore City Corporation covers only an area of 151.16 Sq.Kms. whereas under the Urban Malaria Scheme an area of 496.64 Sq.Km. has been covered. The total area of 151.16 Sq.Km. has been divided into 12 ranges for mosquito control by the Bangalore City Corporation, each headed by a range health officer.

1.2. Problem: A comprehensive report was prepared by the Late Dr. T. R. Rao, a well known malariologist, at the request of the then Health Officer of Bangalore City Corporation, Dr. Sridhar Upodhyaya in 1975. This report highlights the cause of mosquito nuisance in Bangalore City. The main source of *Culex quinquefasciatus* breeding was then identified and classified into the following categories.

a. Open nulla (drain) carrying sewage and sullage,
b. Storm water drains,
c. Box drains,
d. Burrow pits, cesspools, septic tanks, cisterns and fountains,
e. Tanks and Quarries,
f. Wet cultivated land and
g. Wells.

The precise estimate of their relative importance for mosquito breeding was not given in that report since data on the actual numbers, lengths, area etc., of the different breeding places was not provided to Dr. Rao. He however concluded that tanks, storm water drains, box drains, open drains of various type and wet cultivation of grass put together contribute to the bulk of the mosquito nuisance.

1.3. Present organizational set up for mosquito control in Bangalore City.

There are two independent bodies under the Bangalore City Corporation for carrying out mosquito control, viz., the Mosquito Control Unit and the Urban Malaria Scheme. According to a note dated 12th Aug. 1987 given by the Medical Officer of Health, Bangalore City Corporation to the Directorate of Health Services, Bangalore, the following staff were sanctioned under the Urban Malaria Control Scheme and the Mosquito Control unit.

(a) *Staff of Mosquito Control Unit:*

1.	Medical Officer of Health	1
2.	Unit Officer (Senior Health Inspector)	5
3.	Junior Health Inspector	25
4.	Entomological Assistant	1
5.	Laboratory Technician	2
6.	Insect Collector	2
7.	Head Gangman (Superior Field Worker)	25
8.	Gangman (Field Workers)	300
9.	First Division Clerk	1
10.	Second Division Clerk	3
11.	Typist	1
12.	Driver	1
13.	Cleaner	1
14.	Peons	12

The staff under mosquito control unit are employed by the Bangalore City Corporation and they are supposed to cover the entire area of Corporation i.e. 151.16 Sq.Km as well as 1.6 Km. belt area outside the boundaries of Corporation. This area was divided into units, sub-units, blocks and sub-blocks. As per the criteria adopted in 1963 for carrying out the mosquito control operation, each

sub-block of the five-day block (Monday to Friday; Saturday being reserved for minor engineering works) under a sub-unit was attended by a gangman. Two gangmen were assigned the responsibility for minor engineering works, transporting oil etc. Spraying in the entire mosquito breeding sites was to be carried out once in a week. It is nevertheless amazing to note that in spite of such programmes and the available staff, mosquito breeding in Bangalore city continued unhindered and the reason for this can only be attributed to the field workers not sticking to the schedule, and there was no proper supervision of the programme or management of the staff.

(b) *Staff of Urban Malaria Control Scheme*:

1. Senior Biologist	...	...	1
2. Insect Collector	...	...	18
3. Superior Field Worker	...	...	169
4. Field Worker	...	...	282
5. Driver	...	...	1

The above staff are additionally made available to the Corporation by the NMEP for covering a total area of 496.64 Sq.Km. (vide letter No. MOH(MC)/ENT/27/87–88, dated 12.8.87 by the Health Officer, BCC to the Director, Health & Family Welfare Services, Bangalore).

Thus under the Corporation, there is an overall strength of 776 field workers and superior field workers meant for mosquito control on the pay roll, in addition to other supervisory staff, drivers, etc. Though the staff sanctioned under urban malaria scheme were supposed to control mosquitoes in the extended areas of Bangalore, the area was not demarcated into units, subunits and blocks. Therefore, antilarval measures are not undertaken in the extended areas in a regular and planned manner. However, the staff under this scheme were entrusted. with deweeding work in tanks. These staff are working at present under direct control of a "*Surgeon for mosquito control*" and a Medical Officer of Health. These staff are supposed to be used for weekly larvicidal application and deweeding of tanks, in addition to occasional malathion ULV fogging in selected localities.

1.4. Present usage of Insecticides:

Insecticides purchased by the BCC for mosquito control are Abate, Baytex, M.L. Oil, Paris green, Flytox 100 (Pyrosene oil), Pyrethrum Extract (2%) and superior Kerosene. The quantity of insecticides used between April 1986 and March 1987 is summarized in Table 1. This clearly indicates that mosquito control is not hampered for want of insecticides. This statement is corroborated by the fact that the total quantum of insecticides used in mosquito control by the Corporation is more than adequate when compared with the quantity of insecticides recommended by the NMEP.

TABLE I. Insecticides consumed during the year 1986–1987

Name of the Insecticide	Adulticide (A)/ Larvicide (L)	Quantity used by Corporation
Pyrethrum Extract (2%)	A	1650 Lit.
Superior Kerosene	A	10000 Lit.
Baytex	L	1310 Lit.
Abate	L	760 Lit.
Paris green	L	4000 Kg.
Pyrosine oil	L	11600 Lit.
Mosquito Larvicidal Oil	L	74000 Lit.

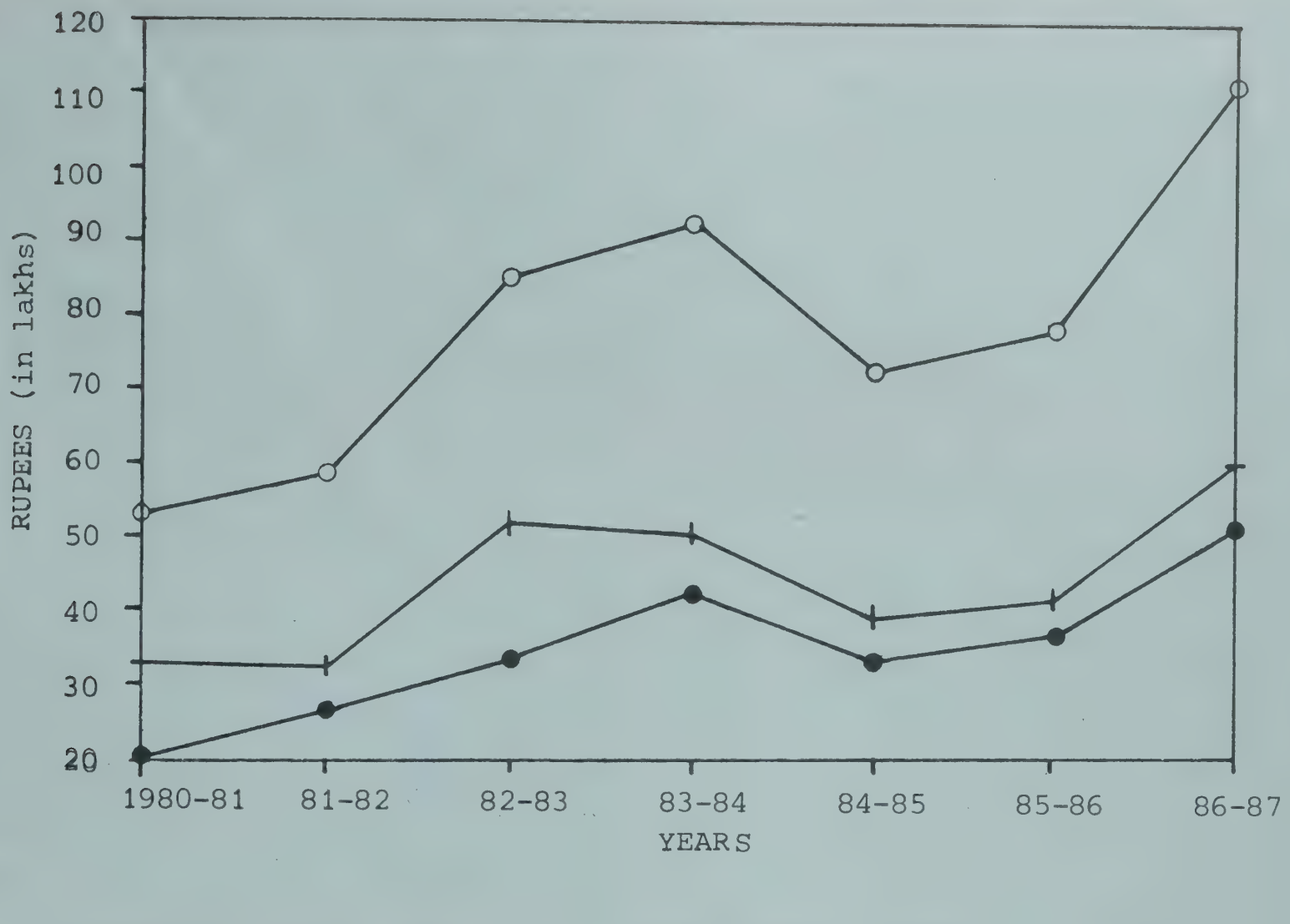


FIG:1. EXPENDITURE INCURRED ON MOSQUITO CONTROL BY THE BCC IN DIFFERENT YEARS.

TABLE 2. Total expenditure for mosquito control in Bangalore (1980–87)* (in Rupees)

Year	Mosquito Control Unit	Urban Malaria Scheme	Total
1980–81	20,08,408	32,97,796	53,06,204
1981–82	26,51,367	32,24,383	58,75,750
1982–83	33,34,571	51,77,877	85,12,448
1983–84	42,22,593	50,36,729	92,59,322
1984–85	33,28,562	39,26,669	72,55,231
1985–86	36,63,869	41,78,454	78,42,323
1986–87	51,48,273	60,36,399	1,11,84,672

* Data from Medical Officer of Health (M.C).

1.5. Funding

Expenditure incurred during the last seven years for mosquito control through funds received under heads of mosquito control unit and the urban malaria control scheme in Bangalore Metropolitan city is given in Table 2, Fig. 1. The expenditure pattern, however, has phenomenally changed since 1962–63, after the mosquito control activities were supposed to have been intensified in the Corporation with the financial assistance from State and Central Governments.

It was only Rs. 1.32 lakhs in 1960–62, which was increased to Rs. 8.62 lakhs in 1969–71, further to Rs. 53.06 lakhs in 1980–81 and still further to Rs. 1.11 crores in 1986–87. Until 1962 the share of the mosquito control operation was about 40% of the expenditure under preventive medicine, but it increased phenomenally to 78% by 1978–81. While this trend clearly indicates the importance given to mosquito control by the Corporation on one hand, it is however paradoxical to observe, on the other, that in spite of this huge financial outlay and administrative infrastructure available, the mosquito menace continued unabated. This is endorsed by the fact that the per-man-hour mosquito density increased from 4 in early sixties to 21.9 in 1980–81, although even this figure seems to be incorrect since the method and procedure used for determining per-man-hour mosquito density by the concerned authorities were improper and the actual density should have been several times higher.

Yet, there is enough scope for improving the efficiency of the present programme within the available resources. The VCRC, in this report has therefore attempted to systemize the whole mosquito control operation by better men and material management, and by highlighting the areas where greater attention is required.

2. OBJECTIVES

a) To prepare a master plan for mosquito control in about 500 Sq.Km. of developed area in Bangalore.

b) To train the BMCP staff for carrying out operations efficiently and also to monitor the effectiveness of the programme.

3. DESIGN CRITERIA

Criterion followed in this plan is to make the programme SIMPLE, ECONOMICAL, ECOLOGICALLY SOUND, RELIABLE, LABOUR INTENSIVE and COMPATIBLE to benefit other sections of health and sanitation.

Keeping these objectives and design criteria in mind, a time bound plan of action was drawn and strictly followed for preparing the master plan.

4. GENERAL DESCRIPTION OF BANGALORE CITY

4.1. Topography:

Bangalore city (alt. 840–940m above MSL, 78° 30° longitude and 13° N latitude) is situated in the centre of southern penninsular India, equidistant from east and west coasts. Being situated on a ridge, the city is divided into two distinct river valleys, 1) South Pennar Basin, sloping towards the east, and 2) Arkavathi Basin, sloping towards the south-west.

The greater Bangalore metropolis covers an area of 496.64 Sq.Km. According to the 1981 census the population of the city was 2.90 million which has by now (1987) exceeded 4 million.

The developed area of 496.64 Sq.Km. is divided into two distinct zones, 1) The inner circle of 151.16 Sq.Km. is under the Bangalore City Corporation and 2) the outer circle of 345.48 Sq.Km. is under the Bangalore Development Authority. However, it has been proposed that the entire area of 496.64 Sq.Km. will ultimately be covered by the Bangalore City Corporation.

4.2. Climate:

Overall climate of the Bangalore city can be described as salubrious throughout the year. It is characterised by three seasons.

a) *The Winter Season:* The winter season extending from December to February is cool and dry. This is a period of very little or no rainfall, the mean rainfall being only about 10 mm.

b) *The Summer Season*: The summer begins in March and extends upto May, with temperatures rapidly rising to reach the maximum of about 33.5°C in April-May. March is a dry month with low humidity. April and May are months of considerable thunderstorm activity and an average rainfall of about 160 mm, most of which fall in May.

c) *The Rainy Season*: Rains in Bangalore are due to both south-west and north-east monsoon. South west monsoon brings rain during June to September. The climate during this period is moist, cool and overcast sky. Total rainfall during this period is about 490 mm. The peak rainfall (143 mm) occurs during the month of September. It is also a period of strong and steady winds, blowing from the southwest to west. The north east monsoon brings rain during October to November. The weather during this period is also characterized as cool and humid with fairly clear sky. Of the annual rainfall of 844 mm, a little more than half occurs during the south-west monsoon period and about a quarter in the north-east monsoon period. Appreciable rainfall also occurs in April and May.

Temperature:

December is the coldest month with a mean maximum temperature of 26.5°C. The highest temperature recorded was 34.1°C in the month of April. The mean daily maximum temperatures were generally higher in the months of March, April and May, ranging from 32.4°C to 34.1°C. But in the remaining months, the maximum temperatures do not exceed 30°C.

Humidity:

The highest mean relative humidity of 75 to 78 per cent occurs in the months of June to November. During December to May, the mean relative humidity ranges from 59% (Jan.) to 70% (Dec.). There is a rapid fall in relative humidity from December to March. There is a sharp rise between March and June, the increase being most rapid between May and June.

The climatological characteristics of Bangalore are presented in Table 3.

TABLE 3. Climatological data of Bangalore city (based on 60 years data 1881–1940 at the Central Observatory, Bangalore).

Month	Mean daily Max. ° C.	Mean daily Min. ° C.	Mean Temp. Max. ° C.	Mean relative humidity (%)	Mean monthly rain fall (mm)
Jan.	26.8	14.1	20.4	63.0	6.1
Feb.	29.8	15.5	22.7	54.0	6.7
Mar.	32.4	18.1	25.2	46.0	10.0
Apr.	33.5	20.6	27.1	53.0	40.0
May	32.9	20.5	26.7	60.0	105.0
June	29.1	19.3	24.2	70.0	60.0
July	27.4	18.7	23.1	75.0	96.0
Aug.	27.4	18.7	23.1	76.0	125.0
Sept.	27.8	18.5	23.2	76.0	168.0
Oct.	27.6	18.3	22.9	75.0	148.0
Nov.	26.3	16.5	21.4	73.0	68.0
Dec.	25.7	20.1	20.1	69.0	11.0

4.3. Water Supply and Sewerage:

It has been reported that 435 MLD of water is supplied for the 4 million population and industries of the Bangalore metropolitan city, as given below:

1) Arkavathi Basin:		
a) Hesaraghatta	...	22.5 MLD
b) T.G. Halli	...	143.0 MLD
2) Cauvery Basin:		
a) I Stage	...	135.0 MLD
b) II Stage	...	135.0 MLD
Total	...	435.5 MLD

In addition to the above mentioned major water sources, there are other sources of water supply (e.g. borewells, wells) which are not accounted for.

The estimated availability of waste water of Bangalore city is about 652 MLD. The BWSSB has a capacity to process only 396 MLD of waste water and the remaining is *diverted into different tanks, untreated.* Even the full available capacity of BWSSB is not being used due to shortage of power and various other reasons. Thus in most cases untreated sewage flows into the valleys polluting in course the various tanks and rivers.

Generally sewerage lines run parallel to storm water canals and are blocked. Instead of cleaning these sewerage lines and make them functional the BWSSB has allowed the sewage to flow through storm water canals in various canals. This converted all the storm water canals into potential breeding ground for mosquitoes. The BWSSB should undertake a crash programme for preventing the flow of the sewage water into the storm water canals.

4.4. Mosquito fauna of Bangalore City:

Culex quinquefasciatus is the dominant species in indoor resting collections and 97.0% of the total catch comprises of this species. The other important species were *Anopheles stephensi* and *An. culicifacies* which are the vectors of malaria, comprising only 0.5% and 0.1% of the total collection respectively. The other common mosquito was *An. subpictus* which formed 1.2% of the total catch. The other species of lesser importance were *Cx. gelidus, Cx. vishnui* group, *Cx.* (*Lutzia*) *fuscanus, Mansonia annulifera, An. vagus, Aedes aegypti* and *Armigerus subalbatus* which formed less than 1.0% of the total catch. However, in the garden areas like Lal Bagh and Cubbon Park, *Ae. aegypti* and *Ae. albopictus* breeding in tree holes is common during and after the wet season.

4.5. Breeding habitats of Cx. quinquefasciatus:

Though *Cx. quinquefasciatus* can breed in any type of water collection, the preferred breeding habitats are stagnant and polluted water bodies. The major breeding habitats in Bangalore are discussed below:

4.5.1. *Storm-water canal*:

Storm water canals which are designed to carry rain water now carry sewage water. The gradient of the drains though generally does not permit any water stagnation, indiscriminate dumping of garbage blocks the free flow of water and results in breeding of *Cx. quinquefasciatus.* It is estimated that *about 4,000 mosquitoes emerge per Sq.m. area of storm water canal per day.* In Bangalore City the storm water canals occupy 1,69,600 Sq.m. of surface area.

4.5.2. *Tanks*:

There are many tanks in Bangalore city, which was also known as the city of lakes. These ornamental tanks carrying fresh water are used for recreational purpose and are charged by ground water. These tanks were free from any mosquito breeding until about a decade ago. With the expansion of city most of these tanks were breached and converted into housing plots. In the remaining tanks sullage and sewage was diverted from nearby new residential colonies, thus converting them into heavy breeding grounds for *Cx.quinquefasciatus.* It was estimated that 2,500 mosquitoes emerged per Sq.m. per day from the tanks which received sullage and sewage. There are 37 such tanks in the Bangalore city which have potential for mosquito breeding (Fig.2). *An estimated 250 million mosquitoes emerge per day from these tanks alone.*

Major tanks and drains in Bangalore Metropolitan area

Tanks *Drains* *Sewage treatment plant*

1. Bellandur
2. Agaram
3. Madivala
4. Hulimavu
5. Duraiswamypalya
6. Sarakki
7. Uttarahalli
8. Arahalli
9. Hosekerahalli
10. Nayandaha
11. Lorrypalya
12. Lalbagh
13. Kempabhudi
14. Dasarahalli
15. Kamakshipalya
16. Sankey
17. Mattikere
18. Hebbal
19. Nagavara
20. Kalagondanahalli
21. Hennur
22. Kacherakanahalli
23. Banasavadi
24. Naganapalya
25. Dooravaninagar
26. Byappanahalli
27. Kodarampalya
28. Ulsoor
29. Byrasandra
30. Annasandrapalya
31. Doddanekundi
32. Lingarajapura
33. Ittamadu
34. Pappanna
35. Yediyur
36. Krishnarajapura
37. Kengeri

4.5.3. *Box drains*:

There are many permanently covered drains in the Bangalore city which have flat bottom and are commonly known as "box drain". These box drains traverse several kilometers along road sides and most of them are blocked with garbage and silt causing stagnation of water and mosquito breeding. Since they are covered, no mosquito control measures are undertaken. *About 160 mosquitoes emerge per Sq.m. per day from these box drains.*

4.5.4. *Wet cultivation*:

Many agriculturists grow grass and vegetables inside the city limits by using sewage and sullage which provide productive breeding sites for *Cx. quinquefasciatus*. There is an estimated 127 hectares of land under grass cultivation which is a major source of breeding within the BCC limit.

4.5.5. *Kutcha drains*:

There are innumerable "kutcha drains" mostly in the peripheral area where water hardly flows due to excessive growth of weeds and garbage being dumped into them. The total length of the kutcha drains runs to *more than 100 Km.* Average emergence of *Cx. quinquefasciatus* from this type of habitat was estimated to 211 per Sq.m. surface area. About *20 million mosquitoes are estimated to emerge per day from the Kutcha drains.*

4.5.6. *'U' drains*:

These are the cement-lined drains which run to a length of 800 Km. Generally, the gradient being proper water does not stagnate. However, due to dumping of garbage by the municipal *Pourakarmikas* as well as the residents, these are converted into ideal breeding grounds for *Cx. quinquefasciatus*. It is estimated that 159 mosquitoes emerge per Sq.m. in such breeding habitats. The unit area production of pupae per Sq.m. in different breeding habitats in Bangalore City is presented in Table 4. *The total estimated number of mosquitoes emerging per day is 128 million.*

4.5.7. *Wells*:

There are 12,549 wells and a sample survey reveals that 4.6% of the wells support breeding of *Cx. quinquefasciatus*. There are certain wells which received direct sewage connection and are major contributing factor for *Cx. quinquefasciatus* breeding. Approximately *60 mosquitoes emerge per day per Sq.m. area of each of the wells breeding.*

4.5.8. *Over head tanks*:

There are about 24,345 over head tanks and most of them remain uncovered and therefore are accessible to mosquitoes. Water being clean, it supports breeding of *An. stephensi* which is an urban malaria vector. A sample survey reveals that only about a third of these overhead tanks are breeding.

4.5.9. *Cess pits*:

About 1,068 cess pits exist in the city limits. These are more common in slum areas and support heavy breeding of *Cx. quinquefasciatus. It has been estimated that nearly 854 mosquitoes emerge per day per Sq.m. surface area of a cess pit.*

4.5.10. *Vacant plots and cesspools*:

In the peripheral areas, low lying plots accumulate rain water which generally do not support *Cx. quinquefasciatus* breeding but channelization of sewage from the nearby houses make it ideal breeding ground for *Cx. quinquefasciatus*.

Vacant plots constitute an area of about, 2,58,806 Sq.m. which obviously provide extensive breeding ground for mosquitoes. Though unit area production of *Cx. quinquefasciatus* from such breeding habitat is low (405 per Sq.m), the vast expanse of such areas compensate for low unit area production. The total contribution to mosquito population (about 104 million per day) from this type of habitat is substantial particularly when the plots are infested with *Eichornia* (water hyacinth).

In Table 4, the unit area production (no. of pupae/sq.m.) in different breeding habitats in Bangalore city is presented for the period commencing from Feb. 1986 to Jan. 1987.

4.5.11. *Miscellaneous:*

In addition to the above mentioned breeding habitats, there are various other types of breeding habitats which are present in innumerable numbers and are of special importance in some localities. For example, tyre-dumps in Kalasipalayam area, oranamental tanks and tree-holes in Cubbon park area, and containers in Kalasipalayam and Thyappa Garden etc.

TABLE 4

Unit area production (Pupae/Sq.m.) of different breeding habitats in Bangalore City

Month and Year	Storm water canals	U-drain & Box drain	Cesspool/ Vacant plot	Cesspits	Wells	Kutcha drains	Tanks
Feb. 86	18,088	232	782	482	14	667	16,172
Mar. 86	20,642	190	233	202	11	80	6,830
Apr. 86	1,817	255	1,127	2,310	9	217	82
May 86	5,941	14	346	—	11	111	620
Jun. 86	617	57	642	—	45	187	15
Jul. 86	618	467	14	3,364	495	28	4,912
Aug. 86	134	75	535	1,047	15	666	1,230
Sept. 86	72	26	38	941	82	90	18
Oct. 86	37	29	645	860	35	95	18
Nov. 86	31	89	109	264	0	25	18
Dec. 86	145	297	323	354	0	215	67
Jan. 87	460	172	62	429	0	148	38
Mean	4,050	159	405	854	60	211	2,502

Though all these breeding habitats contribute to the production of mosquitoes, the *major breeding sources for Cx. quinquefasciatus are storm water canals, tanks and drains.* These habitats according to their production potential are ranked below:

(1) Storm water canal, (2) tanks, (3) cesspits, (4) cesspools, (5) kutcha drains, (6) U-drains and (7) Wells.

The problem of mosquito breeding in these habitats is compounded due to bad engineering and uncoordinated efforts of the various concerned departments like BWSSB, BDA, PWD and BCC. In many places sewage from underground pipelines are allowed to flow into open storm water canals. BDA develops the layout and lets out all sewage and sullage from these layouts into tanks or allows to flow in Kutcha drains. BCC is supposed to maintain the drains free from mosquitoes but the kutcha drains are not treated at all. Thus, BCC, BDA, BWSSB and PWD are the major departments responsible for creation of mosquitogenic conditions. All these departments should be held responsible for the control also, but only the BCC is being held responsible.

5. STRATEGIES ADOPTED

5.1. Environmental Improvement:

Culex quinquefasciatus breeds in stagnant and polluted water, since keeping water flowing can drastically reduce mosquito breeding. Being situated at an altitude of 840 mt. above the mean sea level, gradients are highly favourable for maintenance of flow in drains and the storm water canals.

However the drains are all choked due to indiscriminate dumping of solid waste, excessive weed growth and faulty constructions. *Most of the drains have not been cleaned for years.* Deweeding, desilting and cleaning of these drains can ensure free flow of water thereby reducing mosquito breeding. If this is done no spraying would be required in the drains and will result in considerable savings in the cost of insecticides. To achieve this, more inputs should be provided for garbage and solid waste disposal. The silt and debris removed from drains, if utilized for filling quarry pits and other low lying areas, substantial reduction in breeding habitats can be achieved. However, to maintain drains free from breeding, the

following general recommendations should be followed in all future construction of drains.

(i) Wherever L-shaped drain can take care of draining storm water, box drain should not be constructed.

(ii) All the storm water canals or main drains should be provided with cunettes.

(iii) There are many box drains which are completely closed and cleaning of these drains would cost more than construction of a new drain. Such drains should be replaced with L-shaped drains.

Besides storm water canals and drains there are many tanks which receive sullage and sewage water and are the second major source of mosquito breeding. The breeding in the tanks should be prevented by diverting sullage and sewage away from the tanks and introducing pisciculture. This would not only reduce the mosquito breeding but also generate income for the Government and increase aesthetical value of the tanks.

5.2. Multisectoral involvement (Intersectoral collaboration):

In Bangalore Metropolitan city there are many Government departments and other agencies which are concerned with mosquito abatement in some way or the other. Nevertheless, three departments, due to their distinct and direct relationship with sanitation, statutory provisions for administration of manpower engaged in mosquito control operations and budgetary allocation for the mosquito control in the Bangalore city, stand out with major responsibility. These departments are viz., Bangalore City Corporation (BCC), Bangalore Water Supply and Sewerage Board (BWSSB) and Bangalore Development Authority (BDA).

Under the Karnataka Municipal Corporation Act 1976, Health improvement and its conservancy through preventing communicable diseases by controlling mosquitoes, sanitation, maintenance of proper sewage disposal system etc. are the main functions of Corporation. The BCC implements different health programmes through various, special sub-departments as well as with the collaboration of other sister departments in Bangalore city.

The BCC seems to be financially sound as it has spent approximately Rs. 2904 lakhs in 1979–81, 25% of which has been for "Public Health". The public health expenditure consists of various items, such as conservancy, sanitation, micro-engineering and mosquito control operation.

The BWSSB, formed by an Act of Legislature in 1964, is entrusted with the general duty of providing supply and improving the existing supply of water and *making adequate provisions for the sewerage and disposal of the sewage in the Bangalore Metropolitan area.* The BWSSB comprises mainly of two divisions viz., North and South divisions, which in turn consist of four and three sub-divisions respectively. There are 16 and 14 Service Stations in North and South divisions respectively. It has responsibility of draining the sewage out of the city without letting it mix with the fresh water in the tanks. The mixing of sewage and other polluted domestic and dairy sullage with the storm water and tank water make them mosquitogenic. The designing of the drains and storm water canals as well as making provisions for adequate underground sewerage system in the residential and industrial establishments is entirely the responsibility of the BWSSB.

The BDA is the largest Government agency and is also responsible for making efforts in controlling mosquito menace in the Bangalore Metropolitan city. As per the statutory provision of the BDA it has two members from BCC and one from BWSSB in its Council which is responsible for taking decisions concerning establishment of any new residential or industrial layouts. It is imperative, therefore, that the BDA would make any new layout only with the common and wise consensus of the three important agencies which unfortunately does not happen in view of the present state of the layouts under utilization.

It has now been universally recognized that mosquitogenic conditions in and around the city are mainly *due to bad engineering practices and lack of interdepartmental coordinatin.* To cite just one example, the BDA is developing layouts overlooking the views of BWSSB and BCC. As a result some layouts have already been developed and sewage and sullage water is let into nearby agricultural fields, ornamental tanks or storm water canals. There is no infrastructure to regularly

clean or spray these drains. If the BDA had consulted the BCC and the BWSSB before developing such layouts, the BWSSB could have made some provision to take the sewage and sullage load from these new layouts and the BCC could have provided sanitary facilities for these layouts.

A dialogue between BDA, BWSSB and BCC should atleast evaluate the extent of problem to take necessary action to solve the problem in a phased manner by coordinating their activities. To quote another example, the storm water canals and tanks are under the Public Works Department and it is the responsibility of PWD to see that the tanks are maintained free from pollution. The tanks could be maintained free from weeds and mosquitoes by making a bypass channel all along the bunds, wherever possible, thereby preventing mixing of sullage with clean water (e.g., Bellandur tank) as recommended by the VCRC in its interim report. The tanks with clean water can be used for cultivating edible fish which could improve the economy considerably on one hand, and restrict the mosquito breeding to a minimum, on the other. *For environmental and aesthetic reasons, the tanks should not be breached for converting into housing plots and should be protected.*

5.3. Improvement in Slum Areas:

The creation of slums in many parts of the city is a major reason for the mosquito problem. These slums are often not provided with any drainage system and these slums come up suddenly in Govt. lands. No common place is provided for dumping the garbage or the refuge from where the municipality could lift the waste. Therefore the dumping of garbage blocks the drains, creating mosquitogenic conditions. Here and there small pools are also formed with slight rainfall. The responsibility of maintaining proper development of slums in the City is that of the Karnataka State Slum Clearance Board (KSSCB), which has claimed improvement in some places though such improvements are far from satisfactory and the water stagnation allows copious mosquito breeding. The major problem in these slums is the presence of too many kutcha drains, which hardly ever get cleaned, and the nearly completely choked pucca drains and the storm water canals. The BCC is supposed to ensure cleanliness of the drains and the storm water canals and the non-proliferation of the mosquito breeding in the kutcha drains by regular insecticide application but they often fail to carry out their job due to unplanned house constructions and irregular waste collection from residences. The BWSSB should provide underground sewerage connection for both latrines and sewage water after consulting the KSSCB. Similarly the BDA should also take interest in such developmental activities by allowing establishment of the slums only in appropriate highlands, to initially prevent water accumulation and thereby preventing mosquito breeding.

5.4. Community participation and enforcement of Public Health Act:

Mosquitogenic conditions to a large extent, are also created by the community mainly by dumping of solid waste in the drains. A programme to educate public should be launched by using different mass media like television, radio, newspapers etc. The Public Health Act should be strictly enforced especially against the shop owners and hotel owners, and the Sanitary Inspectors and trade wing of Corporation should play active role in preventing indiscriminate garbage dumping in drains. It is worth mentioning here that the towns covered under UMS should ensure the adoption and enforcement of such by-laws within two years for their continuance under the scheme. More dust-bins should be provided near the market places and garbage should be removed daily.

Many low lying vacant plots mostly in Shanthi Nagar Range and Binnypet Range are major mosquito breeding sources. Notices must be issued by the concerned authority to owners of the plots to level up this area to prevent water accumulation.

5.5. Resource utilization by better men and material management:

Though the funds provided for mosquito control are enormous these funds are not being utilized in a cost-effective manner. Distribution of manpower and insecticide has to be rationalized on the basis of work load and need not be on the area basis.

The existing power flow and organizational set up creates ambiguity, confusion and delay.

The staffing pattern and supervision of work needs to be reorganized in a more rational manner and one such plan is shown in Fig.3.

It is important that a Central Authority for mosquito control is established so that whole operation can be coordinated. There must be an officer of fairly high rank whose writ will run in the administration. Having studied the power flow pattern, it is felt that the Commissioner, BCC will be the right person for this function. He would be assisted by Health Officer and Chief Engineer of BCC. Since mosquito control work involves two distinct functions, i.e., Curative (Health Department) and Preventive (Engineering), Health and Engineering wings have to shoulder the burden of mosquito menace. Engineering Department with all its infrastructure should maintain the drains in functional state by regular desilting of drains, undertaking repair works etc. A list of such drains has been prepared in this master plan. However in future, Health Officer should submit the list of problematic drains to the Commissioner. Health Department's function is to control the breeding by using appropriate method, evaluate and advise the engineering wings to take suitable measures. Coordinating the activities of other departments should be taken at the Commissioner's level.

5.6. Use of appropriate technology for mosquito control at appropriate place and appropriate time:

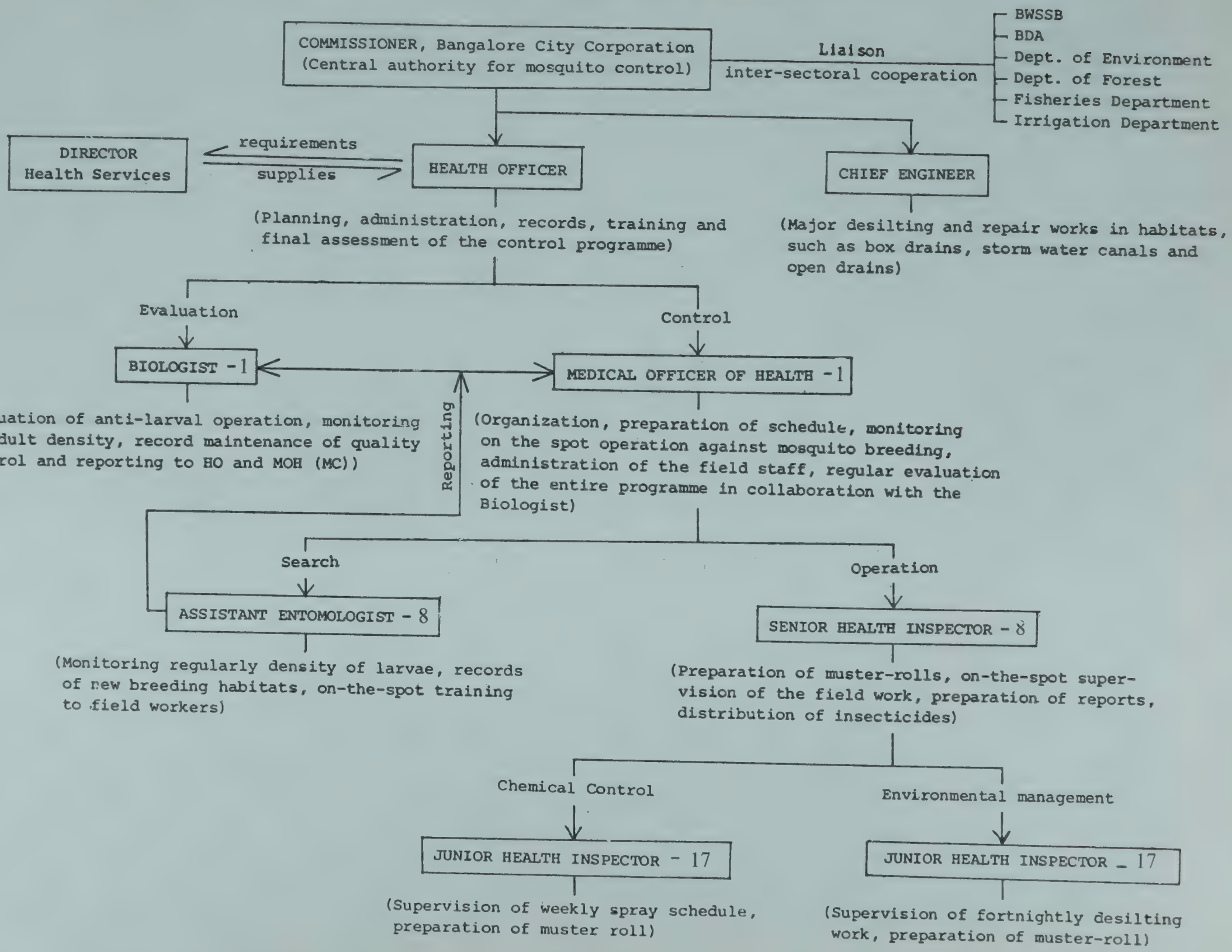
It was noticed that the mosquito control activities are carried out in a *casual manner and follow crisis management technique*. The spraying operation is done more to satisfy a few important citizens with political clout and real breeding habitats in several areas remain unattended. Therefore VCRC is suggesting a guideline on the action to be undertaken in different places. Though there are many potent insecticides available, a lot of money is wasted in procuring substandard insecticides. Insecticide requirement can be adequately met from Government supply under NMEP scheme. If required, more can be purchased from the list furnished in this document. Based on the susceptibility of mosquitoes and safety margin to insecticides, a list of insecticides is recommended for use (Table 5.). The most effective and frequently used larvicide, fenthion, (82.5% EC), should be sprayed by diluting 30 ml in 10 liters of water with the help of a knapsack sprayer to cover 100 Sq.m. Besides, there are many drains where cleaning once a year can result in saving a lot of insecticides and man power. All such drains which require one time cleaning are listed under each range in the following pages. In general, the following broad guidelines are suggested for mosquito control in different habitats.

TABLE 5

Insecticides suitable as larvicide

Insecticide	Chemical Type	Dosage g(ai)/ha	Oral LD 50 mg/kg (rat)
Fenitrothion	OP	100–1000	503
Fenthion	OP	22–112	330
Phenthoate	OP	22–112	300
Temephos	OP	56–112	8600
Chlorpyriphos	OP	11–16	135
ML Oil	–	19–47 lit	negligible
Paris Green	Cu-As complex	840–1000	22

Fig. 3. SUGGESTED ORGANIZATIONAL CHART FOR MOSQUITO CONTROL IN BANGALORE CITY


COMMISSIONER, Bangalore City Corporation
(Central authority for mosquito control)
Liaison
inter-sectoral cooperation
BWSSB
BDA
Dept. of Environment
Dept. of Forest
Fisheries Department
Irrigation Department
DIRECTOR
Health Services
requirements
supplies
HEALTH OFFICER
CHIEF ENGINEER
(Planning, administration, records, training and final assessment of the control programme)
(Major desilting and repair works in habitats, such as box drains, storm water canals and open drains)
Evaluation
Control
BIOLOGIST - 1
MEDICAL OFFICER OF HEALTH - 1
(Evaluation of anti-larval operation, monitoring of adult density, record maintenance of quality control and reporting to HO and MOH (MC))
Reporting
(Organization, preparation of schedule, monitoring on the spot operation against mosquito breeding, administration of the field staff, regular evaluation of the entire programme in collaboration with the Biologist)
Search
Operation
ASSISTANT ENTOMOLOGIST - 8
SENIOR HEALTH INSPECTOR - 8
(Monitoring regularly density of larvae, records of new breeding habitats, on-the-spot training to field workers)
(Preparation of muster-rolls, on-the-spot supervision of the field work, preparation of reports, distribution of insecticides)
Chemical Control
Environmental management
JUNIOR HEALTH INSPECTOR - 17
JUNIOR HEALTH INSPECTOR _ 17
(Supervision of weekly spray schedule, preparation of muster roll)
(Supervision of fortnightly desilting work, preparation of muster-roll)

5.6.1. *Recommendations for Storm Water Canal and Drains:*

Periodical cleaning and desilting alone will prevent mosquito breeding. However there are certain pockets where water stagnates as pool and these could be sprayed with fenthion. Drains in general should be kept open. However due to extension work many drains are being covered and in such areas L-shaped drains may be constructed. As far as possible box drains should be discouraged.

5.6.2. *Recommendations for Tanks:*

The strategy to be followed for controlling breeding in tanks should be to divert the sewage and sullage away from the tanks by constructing bypass drains. Where it is not possible, the edges should be trimmed in such a way that the depth of the water in tanks is not less than 1 ft. in the margins. Tanks which are fairly clean should be used for fish cultivation. Attempts should also be made to decrease the shore-line by deepening the tank during dry season. This method has been extensively used in controlling mosquito breeding in marshy lands.

5.6.3. *Recommendation for K-drains:*

All the kutcha drains in due course of time should be lined. Pending this, all the K-drains should be cleaned and sprayed with fenthion and oil mixture.

5.6.4. *Recommendation for Cesspits:*

In the slum areas this type of breeding habitat is a major contributing factor. All the cess pits should be sprayed weekly with fenthion.

5.6.5. *Recommendation for Cesspools:*

Cess pools and low lying vacant plots should be filled up with debris and silt removed from nearby drains. Pending completion of filling work, all these cess pools should be sprayed with fenthion.

5.6.6. *Recommendation for Wells:*

Mosquito breeding in unused wells could be controlled by using Expanded Polystyrene beads (EPS) which was successfully demonstrated by VCRC in Bangalore city. Mosquito control in used wells should be done exclusively by releasing larvivorous fishes.

5.6.7. *Recommendation for control of Aedes mosquitoes in tree-holes:*

At many places biological control agents can also be effectively used to help reduce the vector population. For instance, in Lal Bagh area and Cubbon Park area where lots of trees are present in which *Aedes* mosquitoes breed and take shelter, the use of *Toxorhynchites*, a non-biting mosquito predator can be advantageous. The VCRC can give the expertise on rearing of the *Toxorhynchites* mosquitoes and can impart training to the staff of the Health Department or Corporation for preparing their own stock for release in the tree holes.

5.6.8. *Recommendation for control of mosquitoes breeding in grass lands:*

Mosquitoes breed extensively in the shallow water bodies formed in the wet grass lands in and around the Bangalore city. Since control of mosquito breeding in such large wet cultivation areas by insecticidal spraying is not economical in long run, the utility of a mermethid parasite, *Romanomermis* sp., can be exploited. The VCRC has got expertise in rearing of this mermethid as well as its application for mosquito infestation and can train the staff of the Corporation or the Health Department for mosquito control.

5.6.9. *Recommendation for control of mosquitoes in industrial complexes:*

There are altogether 27 major industries identified by BWSSB for lack of proper sewage disposal arrangement. In addition, there are many small and medium scale industries which are mostly devoid of any proper arrangement for the waste water disposal. Since these are not accessible to the mosquito control staff, neither the extent of breeding could be assessed nor any control measures could be implemented.

Any mosquitogenic condition inside the industries located in the metropolitan area is bound to affect the control programme outside as well. Therefore, these industrial units must make their own arrangement for vector control in collaboration with the BCC and the technical knowhow can be obtained from specialized professional organizations like VCRC.

The Health Officer, BCC should be given statutory powers to inspect and take appropriate

action for preventing mosquito breeding within a time frame.

5.7. Monitoring and feed back:

A vital but often neglected component of any major programme such as the Bangalore Mosquito Control Project is the evaluation of performance to permit feed back for better management. Implementation of any programme is a dynamic process and changes in the strategy to suit the local need is a prime requisite.

As per the 3rd review committee on Urban Malaria Scheme of NMEP, geographical reconnaissance for *enumeration* of permanent potential vector breeding places *should be a continuous process* and *records should be updated every year.* It is therefore essential to enumerate:

(1) List of houses, open plots, industrial and commercial premises.
(2) List of premises-wise permanent potential vector breeding sites.
(3) Divisions and subdivisions of the town area into wards, sectors and blocks for facilitating equitable distribution of work to the field staff.

The monitoring programme should be directed to ensure that the recommendations have been fully and efficiently implemented (which would ensure the accountability of project staff in the execution of their duties) and to evaluate the effectiveness of the strategy followed in Bangalore City.

"Success of programs depend not only on the availability of adequate technical tools but also on the community's will and means to use these tools for best advantage. Thus it comes down to the problems of Good Management, Management and Training of Manpower, Management of financial resources, stimulation of public cooperation —all this in relation to existing need and conflicting priority".

—BRUCE CHWATT

CHAPTER II

1. Demarcation of Ranges for Mosquito Control

The proposed area for mosquito control covering 496.64 Sq.km. is divided into 24 ranges or zones (Fig.4). The inner circle of 151.16 Sq.km. within Corporation area has already been divided into 12 ranges and will remain unchanged for mosquito control operations. However peripheral areas covering about 345.48 Sq.km. have now been further divided into 12 zones each of which is contiguous with one inner circle range and demarcated by permanent land marks, such as important roads or railway lines.

2. Criteria for staff deployment:

Criteria followed for staff deployment are such that the work allotted will be conveniently accomplished within a time limit by each team of workers. For spraying operation each operator has to cover only 200 Sq.m./day, for cleaning and deweeding 200 m/day and for monitoring 0.5 Sq. km./day. Some additional staff over the actual requirement has been provided to cope up with the emergency caused by absenteeism, holidays and the staff on leave. This additional staff will also facilitate the team leaders to tackle special problems by redeploying staff as per the need of the time without hampering the routine work.

Note: Abbreviations used in Tables listing drains requiring yearly cleaning and engineering work are expanded below.

C = Covered, UC = Uncovered, Ce = Cemented, K = Kutcha drain, L = L-type drain, U = U-type drain.

3. Description and work plan of the ranges

Mosquitogenic conditions in each range and the plan of operation in each of these are detailed below. In the microlevel plan all the problematic breeding habitats in all the 24 ranges are listed in detail and suitable remedial measures have been suggested. Since breeding habitats will change with time and are related to developmental activity, a survey team, as suggested in microlevel plan, should continuously update the information on breeding habitats.

3.1. MALLESWARAM RANGE

Malleswaram range is situated on the western side of the town and it covers an area of 12 sq.km. The total population of this area is about 1,90,000. For mosquito control as well as for the sanitation purposes the whole area is divided into two subunits (A & B), and the whole area under these subunits is further divided into 7 divisions. Localities included in this range are described in Table:6.

Breeding Habitats:

Total breeding habitats and the respective area of each type of breeding habitats in the Range have been enumerated and the same are summarized below in Table: 7.

Some of these breeding habitats being of greater significance are elaborately described below:

Drains:

Various kinds of drains in the range were surveyed and measured, and their types were determined. These are summarized in Table: 8.

Tanks:

There is only one major tank in this range known as Sankey Tank which measures about 7.90 ha. This is free from sewage connections and consequently, also the breeding of *Cx. quinquefasciatus*.

Wet cultivation:

Gokul Tank, which was breached earlier, is now being used for grass cultivation. Approximately 10 hectares of grass field irrigated by using waste water is the major source of breeding in this area. Mosquito breeding is restricted only in the unlined irrigation channels and few pockets with stagnating water.

FIG. 4. Proposed Mosquito Control Ranges in Bangalore Metropolitan Area

1. Malleswaram
2. Rajaji Nagar
3. Gandhi Nagar
4. Chikkapet
5. Binnypet
6. Chamarajpet
7. Basavangudi
8. Jayanagar
9. Shanthi Nagar
10. Shivaji Nagar
11. Bharathi Nagar
12. Jayamahal
13. Nagavara
14. Banasavadi
15. Byrasandara
16. HAL
17. Agaram
18. Madiwala
19. Sarakki
20. Hosekerahalli
21. Nagarbhavi
22. Peenya
23. HMT
24. Hebbal

TABLE 6

Divisions and localities in Malleswaram Range

Division No.	Name of the locality
1 A	Pipeline, Model colony, Mutton Market, A.K. Colony.
	Jabbhar Block, Wholesale Market Yard, B.K. Nagar, Bandappa Road, L.N. Colony, Ramayya Road, Lachappa Garden, Rajaram Nagar, Ambedkar Nagar, Pampana Nagar Extension.
1 B	L.C.R. Compound, HMT Lay out, Gokul I Stage.
	Triveni colony.
2 A	K.N. Extension, Sudama Nagar, Diwanarapalaya Village.
	Mattikere, A.K. Colony, Mattikere Extension.
2 B	Mattikere (upto 8th Cross), Gokul II.
	Stage (HMT Road to Subedarchatram), K.N. Extension (1st to 7th Main Road), Subedarapalaya, A.K. Colony, Devanarapalaya Extension, Devasundara.
3	Southern Raghu Hotel, Yeshwantapuram Circle.
	Area: Muslim block, Sriniwasalaya Lay out, Manjunatha Lay out, M.T. Lay out.
4	Sadashivanagar, T. Choudiah Road (upto 13th Cross).
	Kothandaramapuram, Shed area, Shitharthalaya Lay out, Gayatri Lay out, Vyalikawal, Dhobighat.
5	Guddhadahalli, East Vayalikaval, Zabbhar Huts.
	Maruti Extension, Swimming Pool.
6	Mill Corner, Malleswaram, West Margo.
	East Coconut Avenue, Temple Road, Pipe Line.
7	Seshadripuram East, South Link Road North.
	Guddadahalli, Basappa Garden, Pipeline Main Road, Malleswaram Block, Anjaneya Temple Street, Link Road Extension, Muneswara Block, Vivekananda Block.

TABLE 7

Measurements of various types of breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface area (m^2)
Storm Water Canals (SWC)	19,800	20,000
Tanks	1	80,000
Drains	2,15,610	2,15,610
Cess pits	119	119
Cess pools	17	17,050
Wells	1,587	6,160
Overhead Tanks	1,335	2,680
Area under grass cultivation	3	10,00,000
Cement Tanks	92	92

TABLE 8

Measurements of various kinds of drains in all the seven divisions of Malleswaram Range.

Div. No.	Pukka drains (m)			Kutcha drain (m)	Total length of the drain (m)
	Covered	Uncovered	L-Drain		
1 (A)	13135	37810	1560	1650	54155
1 (B)					
2 (A)	2600	6330	500	550	9980
2 (B)					
3	18760	23100	1000	—	42860
4	23100	4180	2200	—	29480
5	21650	8300	3350	—	33300
6	15520	2575	6200	—	24295
7	1100	14430	6010	—	21540
Total	95865	96725	20820	2200	215610

List of drains in this range requiring desilting by Engineering Division is given in Table 9.

Control:

(a) *Storm Water Canal:*

Though there are many drains running for several kms. in this range, only few of them are problematic. They can be maintained free from breeding by environmental methods. Problems in these drains and their solutions are listed below:

a.1. *Malleswaram Storm Water Canal (4.3 km):*

This canal starts from Malleswaram and passes through Seshadripuram, Rajaji Nagar and Magadi Road, and joins Vrishbhavathi Valley in Binnyet Range. Three major feeder drains join the Malleswaram main drain at various places. The Coconut Avenue Road drain, measuring

1.0 km. originates from Kothandaramapuram area and joins the drain near the Malleswaram range office. The Pipe line road drain, measuring 1.5. km., originates from Rajmahal Gudahalli and joins the main drain inside south of Malleswaram range. The Tata Institute drain (15 km) originates from Tata Institute and joins Sankey Tank. This chain of Malleswaram main drain, measuring altogether 7 km., is covered for 4 km. only while the rest of the drain is open. The problem of mosquito breeding occurs in a stretch of 7 km. of the drain in southern Malleswaram range.

Problem:

This entire chain of drain is found damaged at various places. Water is found to stagnate at many places due to garbage dumping and weed growth. It is receiving the raw sewage from nearby colony latrines. Some cattle sheds constructed along the drains release their waste directly into it. Several pipe lines which are running parallel inside the drain are also damaged at many places and the raw sullage and sewage are allowed to flow into the drain. This group of drains create mosquitogenic condition in divisions 3, 4 and 5.

Solutions:

1. BWSSB should rectify all defects and/or leakages in the underground sewerage lines.
2. BCC should undertake desilting and repairing works of the canal and should maintain water flow by regular cleaning.
3. BWSSB and BCC should jointly ensure that the latrines are connected to the underground sewerage system.
4. Pending completion of the above mentioned recommendations, the drains should be sprayed periodically with fenthion at the target dose of 1 ppm.

a.2. *Yeshwanthapuram Main Drain (6 km)*:

This drain originates from Yeshwanthapuram area and runs as a lined canal upto Gokul tank. Afterwards it runs as a kutcha drain upto Chikkamaranahalli beyond which this first traverses as an underground drain for a distance of 5 km. and later as an open canal for a distance of 3 km. upto Hebbal tank. All along the course of the drain the water is utilized for wet cultivation.

Problems:

1. Farmers residing near the drain divert the water by constructing embankments here and there for agricultural purposes. The stagnation of water and wet land cultivation support heavy mosquito breeding.
2. The initial stretch of Yeshwanthapuram drain is not problematic, but the three feeder drains are found to be breeding mosquitoes due to faulty construction. These feeder drains are located in B.K. Nagar, Gokul and the Lachappa Colony.
3. These three feeder drains are also being used for garbage dumping by both public as well as Pourakarmikas.
4. There are some low lying vacant plots in the Lachappa Colony which collect water during monsoon and provide potential breeding ground for mosquitoes.

Solutions:

1. Conversion of K-canals to lined-drains and connecting them to underground system will permanently solve this problem. Pending this, the flow of water should be regulated by de-weeding and channelization.
2. Breeding in the wet cultivation area should be controlled by weekly spraying with fenthion at the target dose of 1 ppm.
3. The three U-drains should be desilted and regraded properly to maintain water flow.
4. Silt and debris removed from these drains should be used for filling the low lying areas.

a.3. *Tata Finley Factory Drain (7 km)*:

It originates from Jalahalli west and joins Yeshwanthapuram main drain near Mattikere.

Problem:

Just before the drain joins Mattikere tank, water in the drain is blocked by agriculturists for farming purposes. This creates stagnation of water and consequently forms breeding grounds for *Cx. quinquefasciatus*.

Solutions:

1. The drain should be regularly desilted for maintaining free flow of water.

2. At the point of bund fenthion should be sprayed at weekly intervals at the target dose of 1 ppm.

a.4. *Pipe Line Drain (1.5. km)*:

This drain originates from Rajamahalguttahalli and is connected with the Malleswaram Main Drain near the 'C' Cross Link Road.

Problem:

While the initial length of 500 m of the drain is fully covered, the remaining part of the drain is permanently open. The drain is directly connected with latrine connections at several places in the Pipe Line colony, thereby forms a major breeding site of mosquitoes.

Solutions:

1. The BWSSB and BCC must jointly plan to provide the underground sewerage for latrine connections in the area.
2. For the time being the drain may be sprayed weekly with fenthion at the optimum dose of 1 ppm as the above recommendation may take time to be implemented.

a.5. *Subsidiary drains*:

Two other major drains, one originating from Subedarpalya and another from the Central Power Station Complex, run as a stonelined canal to the extent of the length of 500 m. Both these drains subsequently join to form a single drain at Diwanarapalaya, HMT Main road. It continues northwardly and joins Yeshwantapura main drain north of Mattikere village.

Problem:

The stone slabs on the sides of the drain have collapsed at many points and the rubble blocked the drain at a number of points.

Solution:

1. The Engineering division of the Malleswaram range should repair the sides of the drain and maintain the free flow of water in the drain.

(b) *Wet Cultivation*:

Approximately 10,000 ha. of land in Division Nos. 1 and 2 is under grass cultivation. There are number of irrigational channels and stagnated water bodies in Mattikere and Hebbal Agricultural University areas with grass cultivation. These Channels and water bodies need to be sprayed with fenthion at weekly intervals at the recommended dose of 1 ppm.

(c) *Cess pits and Cess pools*:

There are 119 cess pits and 17 cess pools (17050 sq.mt.) in the entire range. The cess pits should either be closed with the silt removed from the drains or pending this work they should be regularly sprayed with fenthion at the dose of 1 ppm. The cess pools are major breeding sites of *Cx. quinquefasciatus* and therefore efforts must be made to level them up with the silt lifted from the drains at various places as listed in Table: 9. The Bangalore City Corporation should enforce the Public Health Act in reducing breeding sources such as cess pools in various localities. Pending this activity of source reduction, spraying should be carried out weekly in cess pools with fenthion by the mosquito control staff.

(d) *Wells and Overhead tanks*:

There are 1587 (6160 sq. mt.) wells and 1335 (2689 sq.mt.) overhead tanks in the entire range. The mosquito breeding in the wells with potable water should be controlled by releasing fish. The polluted and disused wells should be either covered or, if feasible, Expanded Polystyrene beads should be applied to them for controlling the breeding. The overhead tanks should be essentially covered to prevent mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

Activity	*Staff required*		
	Junior Health Inspector	Headgangmen	Gangmen
1. Spraying	1	—	13
2. Cleaning/Deweeding	1	—	18
3. Monitoring (Search and Evaluation)	—	6	—

WEEKLY SPRAY SCHEDULE FOR MALLESWARAM RANGE

MONDAY

Pipeline, Model Colony, Mutton Market, A.K. Colony, Jabbar Block, Wholesale Market Yard, B.K. Nagar, Bandappa Road, L.N. Colony and Ramaiya Road.

TUESDAY

Lakkappa Garden, Rajaram Nagar, Ambedkar Nagar, Pampa Nagar Extension, LCR Compound, HMT Lay out, Gokul 1st Stage, Triveni Colony and K.N. Extension.

WEDNESDAY

Sudama Nagar, Diwanarapalya, Mattikkere-A.K. Colony, Mattikere-Gokul, K.N. Extension, Subedarpalya and Dewarnarpalya Extension.

THURSADY

Southern Ragu Hotel, Yeswanthapura Circle, Muslim Block, Srinivasapalya Lay out, Manjunath Lay out, M.T. Lay out, Sadasiva Nagar, T. Choudia Road, Kothandaramapuram, Shed Area, Shitharthalaya Lay out, Vayalikaval and Dhobighat.

FRIDAY

Guddadahalli, East Vayalikaval, Zabbar huts, Maruthi Extension, Swimming pool, Mile Corner, Malleswaram West Margo, East Coconut Avenue, Temple Road and Pipe line.

SATURDAY

Seshadripuram East, South link Road, North Guddadahalli, Bassappa Garden, Pipe line Main Road, Malleswaram Block, Anjaneya Temple Street, Link Road Extension, Muneeswara Block and Vivekananda Block.

SCHEDULE FOR CLEANING AND DEWEEDING OF DRAINS IN THE MALLESWARAM RANGE

(To be carried out by Mosquito Control Staff)

MONDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	Gokul, Yeshwantapur 12th Main Road drain	250
2.	Gokul, First phase 17th Main Road drain	100
3.	Gokul, Yeshwantapur 4th Main Road drain	50
4.	Subedarpalaya, N.M. Colony 3rd Cross drain	500
5.	Subedarpalaya 7th Cross Road drain	800
6.	Subedarpalaya, Ramiah Colony 6th 'A' Cross drain	300
7.	L.N. Colony 5th Main Road to 6th Cross Road drain	500
8.	L.N. Colony 5th Main Road drain	200
9.	Modern Colony 1st Cross drain	50
10.	K.N. Extension 7th Main drain	300
	Total length:	3,050

TUESDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	Gokul 1st Phase 3rd Cross Road drain	50
2.	Gokul 1st Phase 16th Main Road drain	100
3.	Gokul Main Road 6th drain	200
4.	Gokul 1st Phase 13th 'B' Main Road drain	200
5.	Subedarpalaya 4th Cross drain	400
6.	Subedarpalaya N.M. Colony 3rd Cross drain	500
7.	Subedarpalaya N.M. Colony 3rd 'A' Cross drain	300
8.	B.K. Nagar 3rd 'B' Main Road drain	100
9.	B.K. Nagar 2nd Cross Road drain	400
10.	Ambedkar Nagar side Road drain	250
11.	K.N. Extension 8th Main to 5th Cross drain	400
12.	Diwanarapalaya 6th Cross drain	200
13.	Yeshwantapur 5th Cross to 2nd Main left side drain	75
	Total length	3,175

WEDNESDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	Modern Colony, Ward Office back side drain	150
2.	Modern Colony 1st Phase 2nd Cross drain	200
3.	B.K. Nagar 9th Cross drain	400
4.	B.K. Nagar 3rd Cross drain	400
5.	B.K. Nagar Main Road right side drain	500
6.	K.N. Extension 5th Cross to 5th Main drain	100
7.	K.N. Extension 4th 'A' and 4th 'B' Main drain	100
8.	Yeshwantapur 2nd 'D' Main Gokul right side drain	100
9.	Yeshwantapur 1st Cross Gokul drain	150
10.	Yeshwantapur 2nd 'D' Main Gokul left side drain	100
11.	Yeshwantapur 6th Cross Gokul drain	75
12.	Gokul Main Road 11th	500
13.	Yeshwantapur 2nd Main to 3rd Cross drain	200
	Total length	2,975

THURSDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	Gokul 60 ft. Road 15th Main Road drain	160
2.	Gokul 60 ft. Road 14th 'A' Main Road drain	120
3.	Gokul 14th 'A' Main drain	100
4.	Gokul 1st Phase 60 ft. Road 16th 'A' Main drain	100
5.	Gokul 60 ft. Road 16th Main drain	100
6.	Gokul 60 ft. Road 14th 'B' Main Road drain	60
7.	Subedarpalaya N.M. Colony 3rd 'A' Cross	300
8.	Subedarpalaya 4th Main 'A' left side drain	200
9.	Subedarpalaya N.M. Colony 3rd 'B' Cross drain	100
10.	Subedarpalaya 4th Main 'A' right side drain	100
11.	Subedarpalaya Ramaiah Colony 6th 'B' Cross left side drain	200
12.	Subedarpalaya Ramaiah Colony 6th 'B' Cross right side drain	200
13.	L.N. Colony 1st Main Road drain	50
14.	L.N. Colony 3rd Cross Road drain	250
15.	L.N. Colony 1st Main to 6th Main Road drain	500
16.	Ambedkar Nagar Main Road drain	400
	Total length	2,940

FRIDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	B.K. Nagar Main Road left side	500
2.	B.K. Nagar 7th Cross	400
3.	B.K. Nagar 8th Cross	400
4.	B.K. Nagar 10th Cross	400
5.	B.K. Nagar 1st Cross	400
6.	B.K. Nagar 5th Cross	400
7.	B.K. Nagar 6th Cross	400
	Total length	2,900

SATURDAY — I & III Week

Sl.No.	*Locality*	*length in mt.*
1.	Modern Colony Bassappa Road 5th Cross	400
2.	Yeshwantapur West 2nd Cross	75
3.	Yeshwantapur 2nd Main to 3rd Cross	200
4.	Gokul HMT lay out 15th Main	240
5.	Gokul 60 ft. Road — 15th 'A' Main	160
6.	Gokul 1st Phase 13th 'C' Main	200
7.	Gokul 13th Main Road	300
8.	K.N. Extension, Triveni Road	50
9.	K.N. Extension 5th Cross to 5th Main	150
10.	K.N. Extension 9th Cross	200
11.	K.N. Extension 8th Main No.1268	100
12.	Subedarpalaya 4th Cross left side	500
13.	Subedarpalaya N.M. Colony 3rd 'B' Cross	100
14.	Subedarpalaya 4th Cross right side	500
	Total length	3,175

MONDAY — II & IV Week

Sl.No.	*Locality*	*length in mt.*
1.	Gokul Extension Road 2nd Main Road	50
2.	Gokul (Yeshwantapur) 3rd 'A' Main Road	100
3.	Gokul (Yeshwantapur) 3rd Main Road	200
4.	Yeshwantapur 2nd Cross Gokul	150
5.	Pampa Nagar (kutcha drain)	200
6.	Mohan Ram Nagar (kutcha drain)	200
7.	HMT Main Road to Subedarpalaya (kutcha drain)	300
8.	Bank Colony — Gokul (kutcha drain)	120
9.	Gokul Tank to HMT Main Road (kutcha drain)	800
10.	Pipeline Road 754/1 'L' drain	250
11.	Anjaneya Temple side 'L' drain	100
12.	Modern Colony, 2nd Cross 'L' drain	100
13.	Modern Colony 3rd Cross 'L' drain	300
	Total length	2,870

TUESDAY — II & IV Week

Sl.No.	*Locality*	*length in mt.*
1.	B.K. Nagar to Gokul tank Mouth (SWC)	700
2.	P.C. Muniswamy, Ex. M.L.A. Residence (SWC)	30
3.	Gokul 2nd Main to 3rd Cross (SWC)	100
4.	Seshadripuram to Nagappa Street (SWC)	500
5.	Gokul 3rd Cross to 1st Main (SWC)	300
6.	Devasandra — House No.365	20
7.	Devasandra — House No.397 (Kutcha drain)	100
8.	Devasandra — House No.397 — 395 (kutcha drain)	50
9.	Vijayakumar Store — South end (kutcha drain)	300
10.	Devasandra — House No. 367 (kutcha drain)	50
11.	Devasandra — House No.355 (kutcha drain)	50
12.	Devasandra — House No.395 ('L' drain)	50
	Total length	2,250

WEDNESDAY — II & IV Week

Sl.No.	*Locality*	*length in mt.*
1.	M.K. Extension — 13th Main Road	200
2.	M.K. Extension — Colony Road	50
3.	M.K. Extension — HMT Road	200
4.	M.K. Extension — 7th Main Road	400
5.	M.K. Extension — 4th Main Road	400
6.	M.K. Extension — 5th Main Road	400
7.	M.K. Extension — 8th Main Road	400
8.	M.K. Extension — 11th Main Road	400
9.	M.K. Extension — 6th Main Road	400
10.	M.K. Extension — 1st to 2nd Cross	300
	Total lenth	3,150

THURSDAY — II & IV Week

Sl.No.	*Locality*	*length in mt.*
1.	Adarsha Academy of Indian Culture	10
2.	M.K. Layout 14th Cross Road to 18th Main Road	300
3.	Kodandaramapuram Pipeline Cross lane	30
4.	Kodandaramapuram Main Road 11th to Dhobighat	200
5.	Malleswaram Pipeline 'A' Cross (left side)	300
6.	Malleswaram Pipeline 'A' Cross (right side)	200
7.	Malleswaram 'B' Main Road	200
8.	3rd Cross to East Link Road	200
9.	Malleswaram Coconut Avenue	300
10.	Malleswaram 8th Cross to 10th Cross	300
11.	Malleswaram Pipeline Area	200
12.	Basappa Garden	600
	Total length	2,840

FRIDAY — II & IV Week

Sl.No.	*Locality*	*lenght in mt.*
1.	Muneeswara and Vivekananda Block	100
2.	Guttahalli Main Road	400
3.	Muneeswara Block Main Road	300
4.	Vivekananda Block 3rd Cross	120
5.	Pipeline — Anjaneyappa Block 2nd Main East Link Road	600
6.	Nagappa Block 4th Cross	70
7.	Kodandarampura, Pipeline Cross lane (Div.IV)	30
	Total length	1,620

SATURDAY — II & IV Week

Sl.No.	*Locality*	*length in mt.*
1.	Pipeline Main to Guttahalli	2,000
2.	Main Road 11th from Dhobighat (Div. IV)	200
3.	Adarsha Academy of Indian Academy	10
	Total length	2,210

INSECTICIDE REQUIREMENT PER ANNUM

1.	Fenthion (82.5% EC)	...	250 lit.
2.	ML Oil	... ...	1,000 lit.

Others:

	Expanded Polystyrene Beads	... ...	50 kg.

Additional Equipment Required

1.	Scrappers (Metal)	... ...	20 Nos.
2.	Spade	... ...	10 Nos.
3.	Bonds	... ...	20 Nos.

TABLE 9

List of drains in Malleswaram Range requiring desilting by Engineering Division

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
1	M.B. Colony — Main Road 1st	C	1000	0.5	500
,,	K.N. Extension — Triveni Road	C	200	1	200
,,	Modern Colony — Chamundibar Residence	C	100	0.5	50
,,	B.K. Nagar — Bandappa Road	C	400	0.5	200
,,	Modern Colony — Pipeline Road	C	250	1	250
,,	N.H. Colony — Sixth Cross right	C	500	1	500
,,	N.H. Colony — Sixth Cross left	C	500	1	500
,,	Diwanarapalaya — Krishna Talkies	C	50	1	50
,,	Gokul Extension Road — Main Road 1st Phase	C	300	0.5	150
,,	Yeshwantapura — Main Road 2nd, 4th Cross	C	100	0.5	50
,,	B.K. Nagar — Anjaneyappa Temple Road	C	400	0.5	200
,,	Yeshwantapura — Main Road 1st	C	600	0.75	450
,,	L.N. Colony — Cross 4th to Cross 2nd	C	150	0.5	75
,,	L.N. Colony — Pipeline Road	C	1000	1	1000
,,	Gokul first phase — fifth cross	C	800	0.75	600
,,	Subedarpalaya — HMT Road to S. Palaya	C	500	1	500
,,	Modern Colony — 4th Cross 776/6	C	200	1	200
,,	Subedarpalaya — 3rd Cross right	C	200	0.1	20
,,	Modern Colony — 1st Cross near No.22	C	100	0.5	50
,,	Subedarpalaya — Cross 7th, 3rd Main	C	20	1	20
,,	Modern Colony — Gowrishankar Vill. 1st Cross	C	100	0.5	50
,,	L.N. Colony — 4th Cross Road to 5th	C	200	0.5	100
,,	Modern Colony — MRS Hair dresser	C	200	1	200
,,	Yeshwantapura — Main Road 2nd, 4th Cross	C	100	0.5	50
,,	Gokul Extension Road	C	200	0.5	100
,,	L.N. Colony — Cross 6th	C	200	0.5	100
,,	Modern Colony — Modern colony 2nd Cross	C	200	0.5	100
,,	Subedarpalaya — Main Road 1st	C	500	1	500
,,	Modern Colony — 1st Cross 3/2	C	100	0.5	50
,,	L.N. Colony — Main Road 5th	C	150	0.5	75
,,	L.N. Colony — Main Road 1st	C	1000	0.5	500
,,	Subedarpalaya — Main Road 3rd	C	300	1	300
,,	Yeshwantapura — No.776/6	C	390	1	390
,,	Subedarpalaya — 3rd Cross left	C	200	1	200
,,	L.N. Colony — Cross 4th to Cross 2nd	C	200	0.5	100
,,	L.N. Colony — Cross 1st	L	100	0.5	50
,,	Yeshwantapura — Cross 2nd	L	190	0.5	95
,,	Modern Colony — Cross 1st	L	200	0.1	20
,,	Yeshwantapura — Cross 3rd	L	270	0.5	135
,,	Modern Colony — Cross 3rd	L	300	0.5	150
,,	Modern Colony — Pipeline Road 754/1	L	250	0.1	25
,,	Modern Colony — SC school Road	L	20	0.3	6
,,	Modern Colony — Anjaneya Temple Street	L	100	0.5	50
,,	Modern Colony — Cross 2nd	L	100	0.5	50

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
1	K.N. Extension — Cross Road 4th	L	30	0.3	9
,,	Subedarpalaya — D Cross	UC	800	0.5	400
,,	Diwanarapalaya — Cross 5th	UC	150	0.5	75
,,	K.N. Extension — Main 4th	UC	300	0.5	150
,,	Diwanarapalaya — Krishna Talkies	UC	500	0.5	250
,,	K.N. Extension — Cross 2nd	UC	200	0.5	100
,,	Diwanarapalaya — House No.995	UC	10	0.5	5
,,	K.N. Extension — Cross 6th	UC	300	0.5	150
,,	Modern colony — Vinayaga Milk Diary	UC	150	0.5	75
,,	M.B. Colony — Main Road 6th	UC	100	0.5	50
,,	K.N. Extension — Cross 6th	UC	100	0.5	50
,,	M.B. Colony — Main Road 3rd	UC	200	0.5	100
,,	K.N. Extension — Cross 7th Gokul	UC	200	0.5	100
,,	M.B. Colony — Main Road 5th	UC	250	0.5	125
,,	K.N. Extension — Cross 8th Gokul	UC	200	0.5	100
,,	M.B. Colony — Main Road 5th	UC	250	0.5	125
,,	K.N. Extension — Cross 6th Gokul	UC	100	0.5	50
,,	M.B. Colony — Main Road 4th	UC	250	0.5	125
	K.N. Extension — Yeshwant Circle to D. palaya	UC	1500	0.5	750
,,	M.B. Colony — Cross Road 6th 'A'	UC	300	0.5	150
,,	K.N. Extension — L.V. Kalyanamandapam Road	UC	100	0.5	50
,,	Gokul Extension — 9th Cross	UC	400	0.5	200
,,	K.N. Extension — Pipeline Road to Triveni Road	UC	150	0.5	75
,,	M.B. Colony — Main Road 3rd	UC	250	0.5	125
,,	L.N. Colony — 5th Cross Road	UC	500	0.5	250
,,	Gokul 60 ft. Road — Cross 5th	UC	220	0.7	154
,,	HMT Lay out — 2nd Cross	UC	200	0.75	150
,,	N.H. Colony — Main Road 6th	UC	200	0.5	100
,,	L.N. Colony — Cross 2nd	UC	400	0.5	200
,,	Gokul 60 ft. Road — Gokul Main 14th	UC	300	0.7	210
,,	Gokul 1st Phase — Main 14th B	UC	200	0.75	150
,,	Ramiah College — 6th Cross right	UC	500	0.5	250
,,	L.N. Colony — Main Road 2nd	UC	200	0.5	100
,,	Ramiah College — 6th Cross left	UC	500	0.5	250
,,	L.N. Colony — Main Road 6th	UC	100	0.5	50
,,	Ramiah College — 6th 'A' Cross	UC	300	0.5	150
,,	Gokul first phase — 7th Cross	UC	450	0.75	345
,,	Subedarpalaya — 5th Cross left	UC	400	0.5	200
,,	Gokul first phase — Main Road 13th	UC	300	0.75	225
,,	Gokul 60 ft. Road — Main 60 ft.	UC	800	0.8	640
,,	Gokul first phase — Main Road 12th	UC	100	0.75	75
,,	Subedarpalaya — 9th 'F' Cross	UC	300	0.5	150
,,	Gokul 1st Phase — Main 14th	UC	75	0.75	56.25
,,	B.K. Nagar — Kesava Cinema to Gokul tank	UC	500	0.5	250
,,	Gokul Extension Road — Cross 4th	UC	400	0.5	200
,,	Gokul 60 ft. Road — Gokul Cross 2nd	UC	200	0.7	140
,,	Modern Colony — 4th Cross	UC	200	1	200

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
1	Subedarpalaya — 5th Cross right	UC	400	0.5	200
,,	Gokul Extension — 1st Main	UC	1200	0.5	600
,,	Gokul — HMT lay out	UC	100	0.75	75
,,	Modern Colony — Pipeline 'A' Cross	UC	100	0.5	50
,,	1st Phase Gokul — Main 13th 'A', 3rd Cross	UC	200	0.75	150
,,	Gokul Extension — 10th Cross	UC	400	0.5	200
,,	Subedarpalaya — 9th 'E' Cross	UC	600	0.5	300
,,	K.N. Extension — Achala Tutorials	UC	50	0.5	25
,,	1st Phase Gokul — Cross 3rd	UC	400	0.75	300
,,	K.N. Extension — Cross 9th	UC	120	0.5	60
,,	Diwanarapalaya — Main Road 2nd	UC	300	0.5	150
,,	K.N. Extension — VKP School to paint factory	UC	400	0.5	200
,,	Subedarpalaya — 3rd 'A' Main	UC	300	0.5	150
,,	K.N. Extension — Cross 5th	UC	100	0.5	50
,,	Subedarpalaya — School Street	UC	500	0.5	250
,,	Gokul 1st Phase — 3rd Main Road 13th 'A'	UC	200	0.75	150
,,	Subedarpalaya — 4th 'A' Cross	UC	50	0.5	25
,,	L.N. Colony — Main Road 4th	UC	200	0.5	100
,,	Diwanarapalaya — Main Road 1st	UC	200	0.5	100
,,	L.N. Colony — Cross 6th	UC	250	0.5	125
,,	Diwanarapalaya — Main Road 3rd	UC	100	0.5	50
,,	L.N. Colony — Main Road 3rd	UC	300	0.5	150
,,	Diwanarapalaya — Cross 9th	UC	300	0.5	150
,,	Gokul 1st Phase — Cross Road 8th	UC	280	0.75	210
,,	Diwanarapalaya — Cross 10th	UC	200	0.5	100
,,	Gokul Extension Road — Cross Road 5th	UC	200	0.5	100
,,	Yeshwantapur — Cross 7th B.K. Nagar right	UC	100	0.5	50
,,	Gokul Extension — 3rd Main	UC	1200	0.5	600
,,	Yeshwantapur — Cross 6th 'B' Gokul	UC	100	0.5	50
,,	K.N. Extension — Cross 8th Gokul	UC	200	0.5	100
,,	Yeshwantapur — Cross 7th B.K. Nagar left	UC	100	0.5	50
,,	K.N. Extension — Cross 6th 'A' and 'B'	UC	200	0.5	100
,,	Yeshwantapur — Cross 5th, Main 2nd right	UC	75	0.5	37.5
,,	Gokul 1st Phase — First Cross 60 ft. road	UC	200	0.75	150
,,	Yeshwantapur — Cross 4th Gokul	UC	75	0.5	37.5
,,	L.N. Colony — 6th Main Road	UC	200	0.5	100
,,	Diwanarapalaya — Main Road 3rd	UC	400	0.5	200
,,	Gokul Extension Road — Cross Road 5th	UC	200	0.5	100
,,	Diwanarapalaya — Cross 7th	UC	400	0.5	200
,,	K.N. Extension — Cross 7th Gokul	UC	200	0.5	100
,,	Diwanarapalaya — Metal colony	UC	500	0.5	250
,,	L.N. Colony — 5th Cross to 4th Cross	UC	200	0.5	100
,,	K.N. Extension — Triveni Road	UC	400	0.5	200
,,	Gokul 1st Phase — Cross Road 4th	UC	800	0.75	600
,,	K.N. Extension — Main Road 3rd	UC	400	0.5	200
,,	K.N. Extension — Cross 5th to S.palaya	UC	200	0.5	100
,,	Gokul Extension — 2nd Main	UC	1200	0.5	600

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
1.	Gokul First Phase — 6th Cross	UC	600	0.75	450
,,	K.N. Extension — Cross 4th	UC	200	0.5	100
2.	M.K. Extension — Devasandra	C	200	1	200
,,	M.K. Extension — Main Road 9th	C	400	0.5	200
,,	M.K. Extension — Devasandra	C	200	1	200
,,	,, Main Road 10th	C	400	0.5	200
,,	,, Cross 1st 'B'	C	100	0.5	50
,,	,, Pipeline to Main Road	C	100	1	100
,,	,, Cross 2nd	C	800	0.5	400
,,	,, Cross 1st 'C'	C	200	0.5	100
,,	,, Cross 1st 'A'	C	100	0.5	50
,,	,, Pipeline to Main Road	C	100	1	100
,,	,, Cross 1st 'B'	UC	100	0.5	50
,,	,, Cross 4th	UC	200	0.5	100
,,	,, Cross 1st 'A'	UC	100	0.5	50
,,	,, Main Road 2nd	UC	150	0.5	75
,,	,, Cross 1st 'D'	UC	600	0.5	300
,,	,, Main Road 14th	UC	400	0.5	200
,,	,, Main Road 15th	UC	400	0.5	200
,,	,, Cross 1st 'E'	UC	400	0.5	200
,,	,, Cross 1st 'C'	UC	200	0.5	100
,,	,, Cross 3rd	UC	600	0.5	300
3.	Malleswaram — M.T. Lay out Cross 6th	C	200	0.5	100
,,	Malleswaram — Cross Road 13th	C	1000	0.75	750
,,	Malleswaram — M.T. Lay out Cross 1st	C	200	0.5	100
,,	,, Cross Road 14th	C	150	0.5	75
,,	,, Cross Road 4th	C	150	0.5	75
,,	,, M.T. Lay out Cross 4th	C	300	0.5	150
,,	,, Main Road 11th	C	200	0.75	150
,,	,, Cross Road 18th	C	700	0.75	525
,,	,, M.T. Lay out Cross 2nd	C	300	0.5	150
,,	,, Cross 9th to 3rd Main	C	200	1	200
,,	,, Main Road 3rd to Margosa Road	C	800	1	800
,,	,, Main Road 11th	UC	300	0.5	150
,,	,, Cross 9th to Main 4th	UC	300	0.5	150
,,	,, Main Road 11th	UC	500	0.5	250
,,	,, Main Road 4th	UC	1200	0.75	900
,,	,, Main Road 5th	UC	800	0.5	400
,,	,, M.T. Lay out, 18th Cross	UC	400	0.75	300
,,	,, Cross Road 11th	UC	800	0.5	400
,,	,, Cross Road 11th, House No.110	UC	100	0.5	50
,,	,, Main Road 6th	UC	100	0.75	75
,,	,, Main Road 9th	UC	350	0.5	175
,,	,, Main Road 10th 'A'	UC	200	0.5	100
,,	,, Cross Road 16th	UC	800	0.5	400
,,	,, Main Road 4th, 11-13th Cross	UC	100	0.75	75
,,	,, Main Road 9th	UC	300	0.5	150

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
3.	,, Cross Road 14th 'A'	UC	200	0.5	100
,,	,, Cross Road 17th	UC	800	0.75	600
,,	,, Main Road 11th	UC	500	0.75	375
,,	,, College Cross	UC	200	0.5	100
,,	,, M.T. Lay out 6th Cross	UC	1500	0.5	750
,,	,, M.T. Lay out 5th Cross	UC	1500	0.5	750
,,	,, Main Road 11th	UC	800	0.75	600
4.	,, Margosa Road 17th Cross to Sampangi Road	C	250	0.5	125
,,	,, Temple Road	C	400	1	400
,,	,, West Park Road 13th Cross 13 to 11	C	600	0.75	450
,,	,, Coconut avenue	C	600	0.75	450
,,	,, Cross Road 5th West Park Road to Sampangi Road	C	300	0.75	225
,,	S.P. Extension — Cross 2nd	C	600	0.75	450
	,, East Park Road Cross 16th–13th	C	400	1	400
,,	,, Cross 3rd	C	300	0.5	150
,,	,, Cross 16th Margosa to Sampangi	C	350	0.5	175
,,	,, Cross 4th	C	300	0.8	240
,,	,, Main 2nd Vaiyakaval to Sampangi Road left	C	2000	1	2000
,,	Kodandaramapuram Cross 5th	C	400	0.75	300
,,	,, Margosa Cross 11th to Sampangi Rd.	C	450	1	450
,,	Vaiyakaval — Cross 11th 'B'	C	400	0.5	200
,,	,, Sampangi 11th Cross to Cross 5th K. Puram	C	500	0.25	125
,,	,, Cross 11th 'C'	C	400	0.5	200
,,	,, Cross 14th Margosa to Sampangi	C	400	0.75	300
,,	,, Cross 6th to Temple Road	C	700	0.75	525
,,	,, West Park Road 16th Cross to 14th Cross	C	700	1	700
,,	Forest Research Lab— V.K. Iyengar Road	C	50	0.75	37.5
,,	,, Margosa to west park Rd.	C	250	0.75	187.5
,,	,, V.K.R. Iyengar rd. to Cross 18	C	450	0.75	337.5
,,	,, Sampangi road 15th to 11th Cross	C	700	1	700
,,	,, Cross 18th Margosa to Sampangi road	C	300	1	300
,,	,, Main 2nd Vaiyakaval to Sampangi road right	C	2000	1	2000
,,	,, Sampangi road cross 17-15th	C	600	1	600
,,	,, East park road market to 11th Cross	C	300	0.5	150
,,	,, Sampangi Road 18th Cross to 17th Cross	C	200	0.75	150

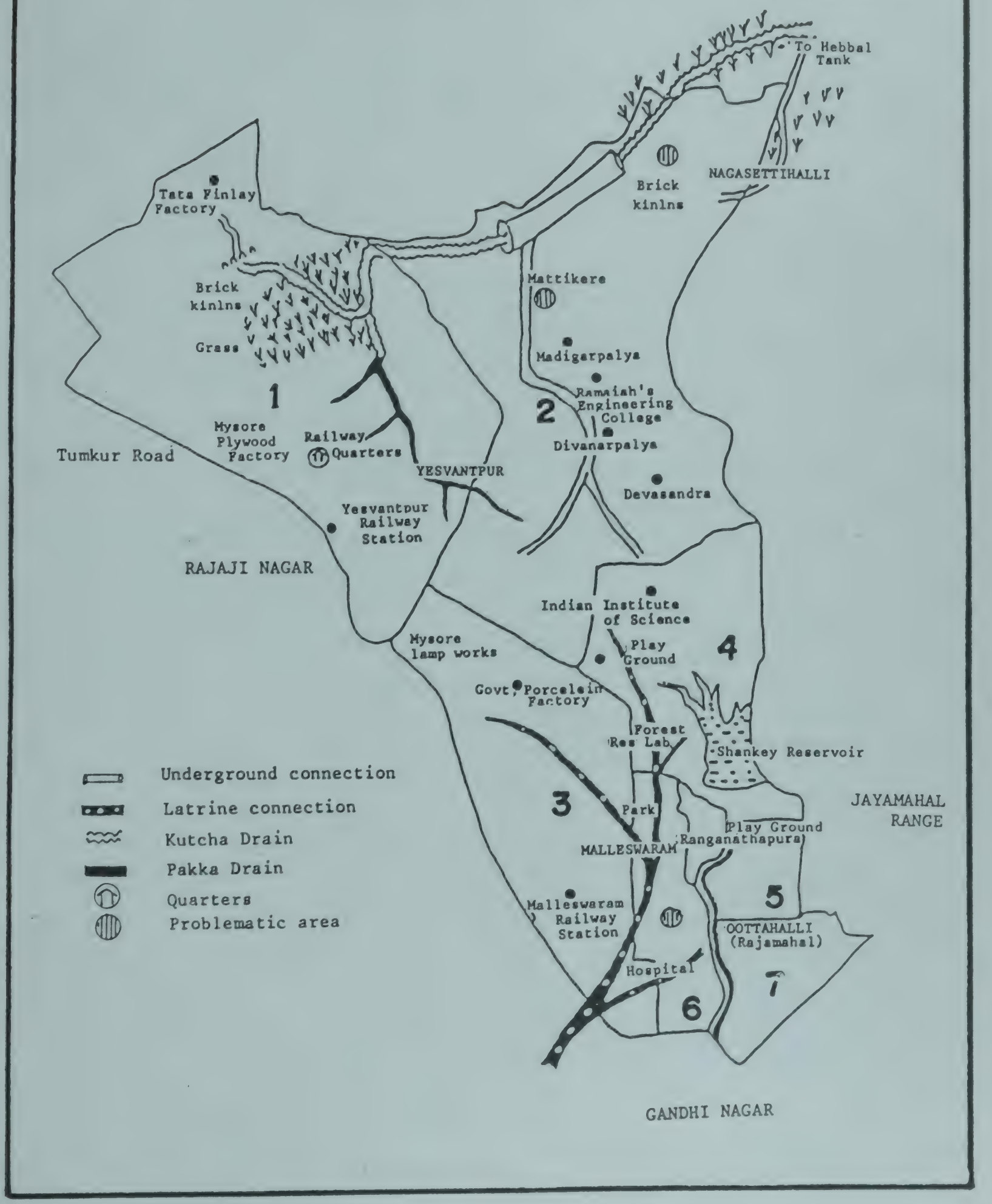
Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
4.	Pipeline — Cross 11th	UC	200	0.5	100
,,	,, Margosa Road 17th Cross to Sampangi Road	UC	250	0.5	125
,,	Vaiyakaval — Cross 11th	UC	150	0.5	75
,,	,, West Park Road cross 16th to cross 14	UC	200	1	200
,,	,, Margosa cross Road 15th to west park road	UC	200	0.5	100
,,	,, East Park Road	UC	350	0.5	175
,,	Kodandaramapuram — Shankey Road	UC	200	0.75	150
,,	,, Cross 13th	UC	200	0.75	150
5.	Malleswaram — Pipeline 'A' Cross	UC	300	0.5	150
,,	,, ,,	UC	200	0.5	100
,,	,, B Main Road	UC	200	0.5	100
,,	III Cross — East link Road	UC	200	0.3	60
7	Malleswaram — Pipeline area	C	200	0.5	100
,,	Basappa Garden	C	600	0.5	300
,,	Muneeswara and Vivekananda Block	C	100	0.5	50
,,	II Main — Pipeline Anjaneyappa Block East link Rd.	UC	600	1	600
,,	Nagappa Block — 4th Cross	UC	100	0.7	70

"For the most part, man made foci of mosquito breeding can be attributed to the negligence and carelessness of construction engineers".

—LE PRINCE IN 'MOSQUITO CONTROL IN PANAMA'
(New York and London, 1916)

MALLESWARAM

P-12 (HEBBAL)



3.2. RAJAJI NAGAR RANGE

Rajaji Nagar range is situated on the western side of the town and it covers an area of about 13 sq.km. Total population in this range is estimated to be 2,40,281 according to the 1981 census. This range is divided into nine divisions. The important localities included in this range are listed in Table: 10.

Breeding Habitats:

Total breeding habitats and their areas in the range are summarized in Table: 11.

Some of these breeding habitats are specially problematic and therefore, require to be defined more elaborately. These are summarized here.

TABLE 10

Divisions and Localities in Rajaji Nagar range.

Division No.	Name of the locality
8	Mahalakshmi Lay out, Industrial suburb, Bovipalya.
9	Milk Colony, Gayathri Nagar, Subramanya Nagar.
10	Nagappa Block
11	Rajaji Nagar I and II Blocks, Manjunatha Nagar, Indra Nagar Slum, Shivanahalli.
12	Prakash Nagar, Ramachandrapuram, Rajaji Nagar III Block.
13	Rajaji Nagar II Stage, Nagappa Block Extension.
14	Rajaji Nagar IV Block, IV 'M' Block.
15	Rajaji Nagar V Block, Rajaji Nagar III Block.
16	Rajaji Nagar VI Block, Industrial area, Agrahara Dasarahalli

TABLE 11

Measurements of various types of breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface area (m^2)
Cess pits	5	5
Cess pools	3	2,168
Wells	333	3,996
Overhead Tanks	120	240
Area under grass cultivation	1	5,000
Cement Tanks	22	37

TABLE 12

Measurements of various drains in all nine divisions of the range.

Div. No.	Pukka Drains(m)			Kutcha drain(m)	Total length of the drain (m)
	Covered	Uncovered	L-Drain		
8	3,850	31,100	2,900	—	37,850
9	2,160	40,980	—	—	43,140
10	2,300	8,450	—	—	10,750
11	6,600	52,750	10,650	—	70,000
12	2,875	12,890	4,400	—	20,165
13	15,250	4,800	2,400	—	22,450
14	2,300	27,650	—	605	30,555
15	2,600	32,550	—	—	35,150
16	1,700	35,000	3,200	1,000	40,900
Total	39,635	2,46,170	23,550	1,605	3,10,960

Drains:

Various kinds of drains in the range were surveyed and measured, and classified according to the type of construction. These are briefed in Table: 12.

In tables 13 and 14, lists of drains requiring engineering work and yearly cleaning are presented.

As it is apparent from the table given above, all drains combinedly run for nearly 300 km. in the range. Drains passing through Shivanahalli, Manjunatha Nagar and Agrahara Dasarahalli support *Cx. quinquefasciatus* breeding. Most of the drains in these areas were found choked with roughage and silt; hence these drains will need be specifically attended to.

Tank:

Dasarahalli tank is the sole tank in the range which measures about 6 ha. in area. It receives sewage from a major storm water canal which results in heavy breeding of *Cx. quinquefasciatus* at the site of union of the storm water canal with the tank.

Control:

(a) *Storm water canals*:

Major storm water canals in the range are described below:

a.1. *Kirloskar Factory Canal (5 km)*:

This drain starts from Kirloskar Factory and runs through Milk Colony, Gayathri Nagar, Lakshminarayanapuram, Prakash Nagar, Sujatha Theatre, Rajaji Nagar 6th Block and Magadhi Road before finally descending into Virishbhavathy Valley.

Problems:

This canal has accumulated plenty of silt at many points and a lot of vegetation has grown along the base and sides of the canal. At some places the canal is also damaged, thereby allowing interruption in the free flow of water. Specific attention of the engineering department is required towards the appropriate placement of the slabs in the drain near the Harichandra Ghat, 7th Cross at Kuvempu Road in Gayathri Nagar.

Solutions:

1. Channelization and deweeding should be regularly carried out in the canal.

2. As a permanent measure, a cunnette should be constructed in the canal to carry even small amount of water in the nearly dry seasons.

3. As slabs are either misplaced or removed from their sites, the engineering wing should replace them back and repair the damaged parts of the drain.

a.2. *Dhobighat Canal (3 km)*:

This canal starts from the Dhobighat near Mahalakshmi lay out and runs through Mahalakshmi Bus Stand and the Karnataka Fruit Factory before finally joining the Nandini lay out main canal in the peripheral area. A subsidiary canal measuring about 1 km. in length starts from Bovipalaya and joins this drain in Mahalakshmi lay out extension.

Problems:

1. This drain is lined only upto Mahalakshmi Bus Stand beyond which it is essentially kutcha. As a consequence, water flow in the drain is never properly maintained.
2. Although, the first 300 m. stretch is dry, at quite many places silt and vegetation are both present in plenty, blocking the free flow of sewage.

Solutions:

1. In order to maintain the free flow of water, regular desilting and cleaning should be carried out periodically in the drain.
2. Unlined part of the drain should be lined as as possible.

a.3. *Industrial Suburb Canal (3 km)*:

This drain starts from the Industrial Suburb area near Regulated Market Yard and joins Nandini layout main storm water canal after passing through Goraguntepalaya. Since a steady water flow is generally maintained in the canal, only cleaning and desilting once a year will prevent any mosquito breeding.

a.4. *Drains passing through the breached Senegurunehalli tank*:

Three major drains coming from three different places enter the Dasarahalli drain after passing through the breached Senegurunehalli tank. These drains are unlined and run through the bed of the Senegurunehalli tank. These drains are elaborated below:

a.4.1. *Shivannahalli drain (1 km)*:

This drain starts from Shivannahalli and after passing through Senegurunehalli tank joins the Dasarahalli canal.

Problem:

The canal is full of silt and vegetation at some points and hence water stagnation and mosquito breeding. This situation is aggravated due to direct latrine connections to the canal at many points.

Solutions:

1. This drain requires regular cleaning and desilting.
2. Latrine connections should be diverted to the underground sewerage system by the BWSSB.

a.4.2. *Indira Nagar Slum drain (3 km)*:

This drain starts from Indira Nagar slum as a box drain. All the 'U' and 'L' drains of the slum are connected to this drain.

Problem:

Since the drain is not properly covered the residents of the slum are dumping garbage into the drain. This drain also joins the Dasarahalli drain after traversing through Manjunath Nagar and the Senegurunehalli tank bed.

Solution:

1. This drain should be properly covered after desilting the drain completely.

a.4.3. *Senegurunehalli drain (1 km)*:

This drain starts from the BDA lay out in Senegurunehalli and after passing through breached Senegurunehalli tank enters into the Dasarahalli drain.

Problem:

The drain is full of silt at the edges as the residents living along the side of the drain dump the garbage etc. directly into this drain.

Solutions:

1. The drain should be cleaned regularly.
2. Under the existing Act of BCC the residents of the area should be prevented from dumping garbage into the drain.

Later the three drains join together and run to the Dasarahalli drain as a lined drain. The total length of the lined part of the drain is approximately 1 km. Here the latrine connections are directly connected to the drain.

Solutions:

1. Latrine connections must be diverted to the underground sewerage system.
2. Drains require to be regularly cleaned.

a.5. *Dasarahalli drain (2 km)*:

This drain starts as an unlined drain from Dasarahalli tank. After passing through industrial area the drain joins the Vrishbhavathi valley near Magadi Road.

Problem:

Water flow is ceased in the drain because of silt deposition and vegetation.

Solution:

The drain should be lined and regularly cleaned. Pending this, spraying should be continued to prevent mosquito breeding.

a.6. *Rammandhir Park Tank (1 km)*:

This drain is provided with a cunnette and it runs as a open drain in the Rammandhir Park Area.

Problem:

This drain passes as a box drain through the Chamundeswari slum where the public latrines are directly connected to the drain. The drain then crosses over the 80 ft. road and subsequently joins the Vrishbhavathi valley.

Solutions:

1. The BWSSB should arrange to divert the direct latrine connections to the underground system.
2. The PWD department must properly fix the slabs over the drain in order to prevent dumping of the garbage into the drain through gaps.

Besides these major problematic drains, there are other drains which require to be regularly cleaned and desilted. Some of them need immediate engineering work but almost all require to be regularly sprayed until engineering works are accomplished in these drains. For convenience of identification of these drains and the respective solutions needed to be attended to, tables depicting individual problems are given in the following pages. Further, a work schedule has also been provided herein for carrying out the cleaning and desilting work properly.

(b) *Wet cultivation*:

Approximately 5000 sq.mt. area of the range is under wet cultivation. The grass cultivation has grown some small pools strewn here and there and only in such places mosquitoes are breeding. These pools should be levelled up with the soil from elevated area. Until this is done, these patches breeding mosquitoes should be sprayed regularly with the recommended dose of fenthion.

(c) *Cess pits and Cess pools*:

There are five cess pits and three cess pools (2000 sq.mt.) only in the Dasarahalli area. The best way to get rid of mosquito breeding in these otherwise unmanageable breeding habitats is to fill these with silt and debris collected from the drains during cleaning. However, pending this work, they can be regularly sprayed with fenthion at the optimum dose of 1 ppm.

(d) *Wells and Overhead tanks*:

Altogether 333 wells and 120 overhead tanks exist in the range, but only 1% of them has been found breeding. While breeding in the potable wells can be easily prevented by releasing fish such as *Tilapia* and *Gambusia*, in unused wells it can be prevented by applying the EPS at the rate of 500 g/sq.mt. The problem of mosquito breeding in the overhead tanks should be tackled by permanently covering the tanks leaving no gaps at all at the point of sealing. In this case the BCC must also utilise the suitable Act.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	13
2.	Cleaning/Deweeding	1	—	21
3.	Monitoring (Search and Evaluation)	—	3	—

WEEKLY SPRAY SCHEDULE FOR RAJAJI NAGAR

MONDAY

Mahalakshmi Lay out, Industrial Suburb and Bovipalaya.

TUESDAY

Milk Colony, Gayathri Nagar, Subramanya Nagar, Nagappa Block and Nagappa Block Extension.

WEDNESDAY

Rajaji Nagar I–III Blocks, Prakash Nagar and Ramachandrapuram.

THURSDAY

Manjunath Nagar, Indira Nagar slum and Shivannahalli.

FRIDAY

Rajaji Nagar IV and V Blocks and Rajaji Nagar IV 'M' Block.

SATURDAY

Rajaji Nagar VI Block, Industrial area and Agrahara Dasarahalli.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN RAJAJINAGAR RANGE

MONDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Yeshwanthpur — Industrial Suburb R.M. Road	500
2.	Yeshwanthapur — 7th Main Road, K-4 Ext.	300
3.	Bovipalaya — 8th Cross	300
4.	Bovipalaya — 1st Main Road	600
5.	Bovipalaya — From 32nd Main Rd. to 3rd Main Rd. (through Sundaravidhyabirudhi Sangha, 1st to 2nd Main Rd.).	1,000
6.	Bovipalaya — 4th Main	500
	Total length	3,200

TUESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Gayathrinagar — 2nd Main	900
2.	Gayathrinagar — 3rd Cross 'B'	400
3.	Gayathrinagar — 3rd 'C' Cross	300
4.	Gayathrinagar — 3rd 'D' Cross	300
5.	Gayathrinagar — 3rd 'A' Cross	400
6.	Rajaji Nagar — 13th Main Road	150
7.	Rajaji Nagar — 34th Main Road	150
8.	Rajaji Nagar — 2nd 'B' Main Road	300
	Total length	2,900

WEDNESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Indira Nagar slum — 3rd Cross	100
2.	Indira Nagar slum — 9th Cross	200
3.	Shivannahalli — 12th Main Rd.	1,000
4.	Shivannahalli — 12 'A' Main Rd.	400
5.	Shivannahalli — 11th Main Rd.	500
6.	Shivannahalli — 2nd 'B' Main Rd.	300
	Total length	2,500

THURSDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Shivannahalli — 9th Main Road	800
2.	Shivannahalli — 8th Main Road	800
3.	Shivannahalli — 7th Main Road	500
4.	Shivannahalli — 6th Main Road	400
5.	Shivannahalli — 5th Main Road	400
	Total length	2,900

FRIDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Shivannahalli — 2nd Line	1,000
2.	Shivannahalli — 1st 'A' Main	700
3.	Shivannahalli — 1st 'C' Main	700
4.	Manjunatha Nagar — 1st Main	600
	Total length	3,000

SATURDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Manjunath Nagar — 2nd Main Road	800
2.	Manjunath Nagar — 3rd Main Road	800
3.	Manjunath Nagar — 4th Main Road	800
4.	Manjunath Nagar 1st Cross	300
5.	Manjunath Nagar 4th Cross	300
	Total length	3,000

MONDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Manjunathnagar — 2nd Cross	500
2.	Manjunathnagar — 3rd Cross	700
3.	Manjunathnagar — 5th Cross	250
4.	Manjunathnagar — 6th Cross	150
5.	Manjunathnagar — 7th Cross	800
6.	Manjunathnagar — 8th Cross	800
	Total length	3,200

TUESDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Manjunathnagar 5th Main Road	100
2.	Manjunathnagar 6th Main Road	100
3.	Manjunathnagar 8th 'B' Main Road	600
4.	East of Chard Rd. — 2nd Block 3rd Stage, 3rd Cross	500
5.	West of Chard Rd. — 4th Cross	200
6.	West of Chard Rd. — 8th 'C' Main Road	300
7.	West of Chard Rd. — 9th Main Road	800
8.	West of Chard Rd. — 11th Main Road	300
	Total length	2,900

WEDNESDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	West of Chard Road — 10th Main Road	800
2.	Prakash Nagar — 10th Cross	700
3.	Prakash Nagar — 1st Main Road	80
4.	Prakash Nagar — 2nd Main Road	200
5.	Prakash Nagar — 5th Main Road	200
6.	Prakash Nagar — 8th Cross	700
7.	Prakash Nagar — 7th Main	300
	Total length	2,980

THURSDAY II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Prakash Nagar — 7th Cross	800
2.	Prakash Nagar — 3rd Main Road	200
3.	Prakash Nagar — 6th 'A' Main Road	200
4.	Prakash Nagar — 10th Main Road	100
5.	Prakash Nagar — 11th 'A' Main Road	100
6.	Prakash Nagar — 9th Main Road	300
7.	Prakash Nagar — 3rd Main 6th Cross	800
8.	Rajaji Nagar — 4th Block, SSI 1st Main (behind Ramkumar Mills)	600
	Total length	3,100

FRIDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Rajaji Nagar — 5th Block, 5th Cross	500
2.	Chamundesvari Nagar slum — 4th Block	100
3.	Rajaji Nagar — 5th Block, 17.E, Main Road	200
4.	Rajaji Nagar — 3rd Block, 53rd Cross	100
5.	Rajaji Nagar — 6th Block, near Magadi Road, 2nd Main	500
6.	Rajaji Nagar — 6th Block, 3rd Main Road Industrial Area	100
7.	Rajaji Nagar — 10, C, Main Road, near Sudha Enterprises	200
8.	Dasarahalli Senegurenhalli Road — 13th Cross, (behind Tank Road to 3rd Main Road)	1,000
	Total length	2,700

SATURDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Dasarahalli Tank Road — 13 'A', 'B' and 'C' Crosses	900
2.	Dasarahalli Tank — 13th Cross	1,000
	Total length	1,900

INSECTICIDE REQUIREMENT PER ANNUM

1.	Fenthion 82.5% E.C.	... ...	250 lit.
2.	ML Oil	... ...	1,000 lit.

Others:

	Expanded Polystyrene beads	... ...	50 Kg.

Additional Equipments:

1.	Scrappers	... ...	20 Nos.
2.	Spade	... ...	10 Nos.
3.	Bonds	... ...	20 Nos.

TABLE 13

List of drains requiring Engineering Work

Div. No.	Locality	Type of drains	Length	Width	Area sq.mt.	Recommendation
8	Bovipalaya — 32nd Main to 3rd Main Sundaravidhyabirudhi Sangh — I & II Main Road	UC	1000	3	3000	regrade
”	Bovipalaya	UC	500	3	1500	”
”	Manjunathnagar — 1st Cross	UC	300	.70	210	replacement of slabs
”	Manjunathnagar — 4th Cross	UC	300	.70	210	”
”	Manjunathnagar — 2nd Cross	UC	500	.70	350	”
”	Manjunathnagar — 3rd Cross	UC	700	.70	490	”
”	Manjunathnagar — 5th Cross	UC	250	.70	175	”
”	Manjunathnagar — 6th Cross	UC	150	.70	105	”
”	Manjunathnagar — 7th Cross	UC	800	.70	560	”
”	Manjunathnagar — 8th Cross	UC	800	.70	560	”
”	Manjunathnagar — 5th Cross	UC	100	.70	70	”
”	Manjunathnagar — 6th Cross	UC	100	.70	70	”
”	Manjunathnagar — 8th Main B	UC	600	1	600	”
”	W.Chard Road — II Block, III St.– 3rd Cross	UC	500	.70	350	”
”	W.Chard Road — 4th Cross	UC	200	.70	140	”
”	W.Chard Road — 8th Main Road	UC	300	.70	210	”
”	W.Chard Road — 9th Main Road	UC	800	.70	560	”
”	W.Chard Road — 10th Main Road	UC	800	.70	560	”
”	W.Chard Road — 11th Main	UC	300	.70	210	”
”	Prakashnagar — 3rd Main Road	UC	800	.70	560	”
”	Rajajinagar 4th Block SSI 1st Main (Behind Ramkumar Mill)	UC	600	.50	300	”
”	Rajajinagar 5th Block — 5th Cross	UC	500	.50	250	”
16	Dasarahalli — Senegunehalli Road 13th Cross Tank behind Road to 3rd Main Road	UC	1000	.30	300	regrade

TABLE 14

Drains requiring only one time Cleaning and Desilting

Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
8	Mahalakshmi Layout — 4th Cross	U	800	.5	400
"	Mahalakshmi Layout — 4th Cross	U	600	.5	300
	Mahalakshmi — 3rd Cross	U	600	.5	300
"	Mahalakshmi Layout — 2nd Cross	U	600	.5	300
"	Mahalakshmi Layout — 1st Cross	U	600	.5	300
"	Gayathrinagar — 4th Main Road	U	1000	.75	750
"	Gayathrinagar — 4th Main Road	UC	1000	.5	500
"	Gayathrinagar — 6th Cross, 4th Main	U	1000	.5	500
"	Gayathrinagar — 2nd Main	U	400	.5	200
"	Gayathrinagar — 5th Cross, 4th Main	U	800	.5	400
"	Gayathrinagar — 4th Cross	U	1000	.5	500
"	Gayathrinagar — 7th Cross	U	1500	.75	1125
"	Gayathrinagar — 2nd Cross	U	400	.5	200
"	Gayathrinagar — 2nd A Cross	U	400	.5	200
"	Gayathrinagar — 2nd B Cross	U	400	.5	200
"	Gayathrinagar — 3rd Cross	U	400	.5	200
"	Gayathrinagar — 8th Cross	U	1000	.75	750
"	Gayathrinagar — 8th A Cross	U	400	.5	200
"	Gayathrinagar — 8th B Cross	U	350	.5	175
"	Gayathrinagar — 13th Cross	U	1000	.5	500
"	Gayathrinagar — 1st Main	U	1000	1	1000
"	Gayathrinagar — 10th Main — E Block	U	1000	.75	750
"	Gayathrinagar — 11th Main	U	1000	.75	750
"	Gayathrinagar — 12th Main	U	1000	.5	500
"	Gayathrinagar — Railway Line Road	U	500	.5	250
"	Gayathrinagar — C Block — 6th Cross	U	400	.5	200
"	Gayathrinagar — 6th Cross	U	400	.5	200
"	Gayathrinagar — 5th Cross	U	400	1	400
"	Gayathrinagar — 11th Main	U	200	.5	100
"	Gayathrinagar — 2nd Main	U	100	.5	50
"	Subramanyanagar — 2nd Main A Block	U	200	.5	100
"	Rajajinagar — ML Layout 1st Main	U	1000	.75	750
"	Rajajinagar — ML Layout — 2nd Main	U	800	.5	400
"	Rajajinagar — ML Layout — 3rd Main	U	800	.5	400
"	Rajajinagar — ML Layout — 4th Main	U	600	.5	300
"	Rajajinagar — ML Layout — 5th Main	U	600	.5	300
"	Rajajinagar — ML Layout — 6th Main	U	600	.5	300
"	Rajajinagar — ML Layout — 14th Cross	U	600	.75	450
"	Rajajinagar — ML Layout — 13th Cross	U	600	.75	450
"	Rajajinagar — ML Layout — 5th Main	U	800	.75	600
"	Rajajinagar — ML Layout — 12th Main	U	800	.75	600
"	Rajajinagar — ML Layout — 11th Cross	U	800	.75	600
"	Rajajinagar — ML Layout — 10th Cross	U	600	.5	300

Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
8	Rajajinagar — ML Layout — 9th Cross	U	600	.5	300
”	Rajajinagar — ML Layout — 8th Cross	U	500	.5	250
”	Rajajinagar — ML Layout — 7th Cross	U	500	.5	250
”	Rajajinagar — 6th Cross	U	500	.5	250
”	Rajajinagar — B Block — 14th Main Road	U	1000	.4	400
”	Rajajinagar — 9th Cross Road	U	400	.4	160
”	Rajajinagar — 2nd A Cross	U	200	.4	80
”	Rajajinagar — 3rd Main	U	200	.3	60
”	Rajajinagar — 1st Main Road	U	300	.3	90
”	Rajajinagar — 5th Cross Road	U	200	.3	60
”	Rajajinagar — 3rd Main Road	U	160	.3	48
”	Rajajinagar — 8th Cross Road	U	240	.5	120
”	Rajajinagar — 1st A Main	U	600	.4	240
”	Rajajinagar — 2nd Main Road	U	600	.5	300
”	Rajajinagar — 1st Cross Road	U	240	.5	120
”	Rajajinagar — 2nd Cross Road	U	300	.5	150
”	Rajajinagar Railway Line Road	U	1000	.5	500
”	Rajajinagar 4th Main Road	U	800	.5	400
”	Rajajinagar 1st Cross Road	U	600	.5	300
9	Rajajinagar Milk Colony — II Cross Road	U	200	.5	100
”	Rajajinagar Milk Colony — III Cross Road	U	160	.5	80
”	Rajajinagar Milk Colony — IV Cross Road	U	200	.5	100
”	Rajajinagar Milk Colony — V Cross Rd.	U	600	.5	300
”	Rajajinagar Milk Colony — VI Cross Rd.	U	160	.5	80
”	Rajajinagar Milk Colony — VII Cross Rd.	U	140	.5	70
”	Rajajinagar Milk Colony — VIII Cross Rd.	U	800	.5	400
”	Rajajinagar Milk Colony — 13th Main Rd.	U	800	.5	400
11	Rajajinagar Voddarapalya Pipeline Road	Ce/U/UC	400	.5	200
”	Rajajinagar 12th Cross	Ce/U/UC	1500	.5	750
”	Rajajinagar 11th Cross	Ce/U/UC	500	.5	250
”	Rajajinagar 10th Cross	Ce/U/UC	500	.5	250
”	Manjunatha Nagar (R.Nagar) Xth Main Rd.	Ce/U/UC	100	.5	50
”	Manjunatha Nagar XI Main Road	Ce/U/UC	800	.5	400
”	Manjunatha Nagar XII Main Road	Ce/U/UC	800	.5	400
”	Manjunatha Nagar XIII Main Road	Ce/U/UC	800	.5	400
”	Manjunatha Nagar XIV Main Road	Ce/U/UC	800	.5	400
12	Rajajinagar III Block 41st Cross	Ce/U/C	400	1	400
”	Rajajinagar 39th Cross	Ce/U/UC	300	.5	150
”	Rajajinagar 38th Cross	Ce/U/UC	300	.5	150
”	Rajajinagar 37th Cross	Ce/U/UC	300	.5	150
”	Rajajinagar 36th Cross	Ce/U/UC	250	.5	125
”	Rajajinagar 36th Cross	Ce/U/C	250	.5	125
”	Conservency Lane 3rd Main	L	400	.3	120
”	Conservency Lane 2nd Main	Ce/U/UC	300	.5	150
”	Conservency Lane 1st Main (80 ft. Road)	Ce/U/UC	1000	1	1000
”	Prakash Nagar (R.Nagar) 3rd Main	Ce/U/UC	200	.7	140

Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
12	Prakash Nagar (R.Nagar) 4th Main	Ce/U/UC	200	.7	140
"	Prakash Nagar (R.Nagar) 8th Main	Ce/U/UC	300	.7	210
"	Prakash Nagar (R.Nagar) 11th Main Road	Ce/U/UC	200	.5	100
"	Rajajinagar — III Block 3rd Cross	Ce/U/UC	200	.5	100
"	Rajajinagar — 3rd B Cross	Ce/U/UC	300	.5	150
"	Rajajinagar — 36th Cross	Ce/U/UC	400	.5	200
"	Rajajinagar — 31st Cross	Ce/U/UC	400	.5	200
"	Rajajinagar — 2nd Block — 29th Cross	Ce/U/UC	150	.5	75
"	Rajajinagar — 19th Main	Ce/U/UC	500	.5	250
"	Rajajinagar — 25th Cross	Ce/U/C	200	1	200
"	Rajajinagar — 19th Main	Ce/U/C	500	1	500
"	Rajajinagar — 20th Cross	Ce/U/C	800	.5	400
"	Prakashnagar Rajaji Nagar 10th Main Rd.	Ce/U/C	200	.7	140
"	Prakashnagar Rajaji Nagar 9th Main Rd.	Ce/U/C	200	.7	140
"	Prakashnagar Rajaji Nagar 8th Main Rd.	L	150	.4	60
"	Prakashnagar Rajaji Nagar 5th Main Rd.	Ce/U/UC	200	.7	140
"	Prakashnagar Rajaji Nagar 6th E Cross	Ce/U/UC	400	.7	280
"	Prakashnagar Rajaji Nagar 6th C Cross	L	200	.4	80
"	Prakashnagar Rajaji Nagar 6th A Cross	L	200	.4	80
"	Prakashnagar Rajaji Nagar 6th A Main	L	200	.4	80
"	Prakashnagar Rajaji Nagar 6th C Main Rd.	L	100	.4	40
"	Prakashnagar Rajaji Nagar 14th Main	Ce/U/UC	100	.7	70
"	Prakashnagar Rajaji Nagar 14th Main	L	100	.4	40
"	Prakashnagar Rajaji Nagar 4th Cross	Ce/U/UC	500	.7	350
"	Prakashnagar Rajaji Nagar 3rd Cross	Ce/U/UC	600	.7	420
"	Prakashnagar Rajaji Nagar 3rd Cross	Ce/U/UC	600	.7	420
"	Prakashnagar Rajaji Nagar 14th Main 2nd Cross	Ce/U/UC	300	.7	210
"	Prakashnagar Rajaji Nagar 14th Main 1st Cross	Ce/U/UC	300	.7	210
"	1st F Main — D Block	Ce/U/UC	120	.7	84
"	3rd Cross Road D Block II Stage Rajaji Nagar	Ce/U/UC	400	.7	280
"	1st H Main Road D Block II Stage	Ce/U/UC	300	.7	210
"	Ramachandrapuram Rajaji Nagar 4th Cross to Kalappa Block	L	200	.3	60
"	Ramachandrapuram Rajaji Nagar 2nd Cross Road	Ce/U/C	50	1	50
"	Ramachandrapuram Rajaji Nagar 1st Main Road	Ce/U/C	100	.5	50
"	A Cross Road — Muddiah Road	Ce/U/C	100	.5	50
"	Prakash Nagar 5th Main to 4th N Block Cross	Ce/U/C	150	.5	75
"	59th B Cross Road — Maruthi Automobiles	Ce/U/C	30	.5	15
"	59th A Cross N Block to Sujatha Talkies Main Road	Ce/U/C	600	.5	300

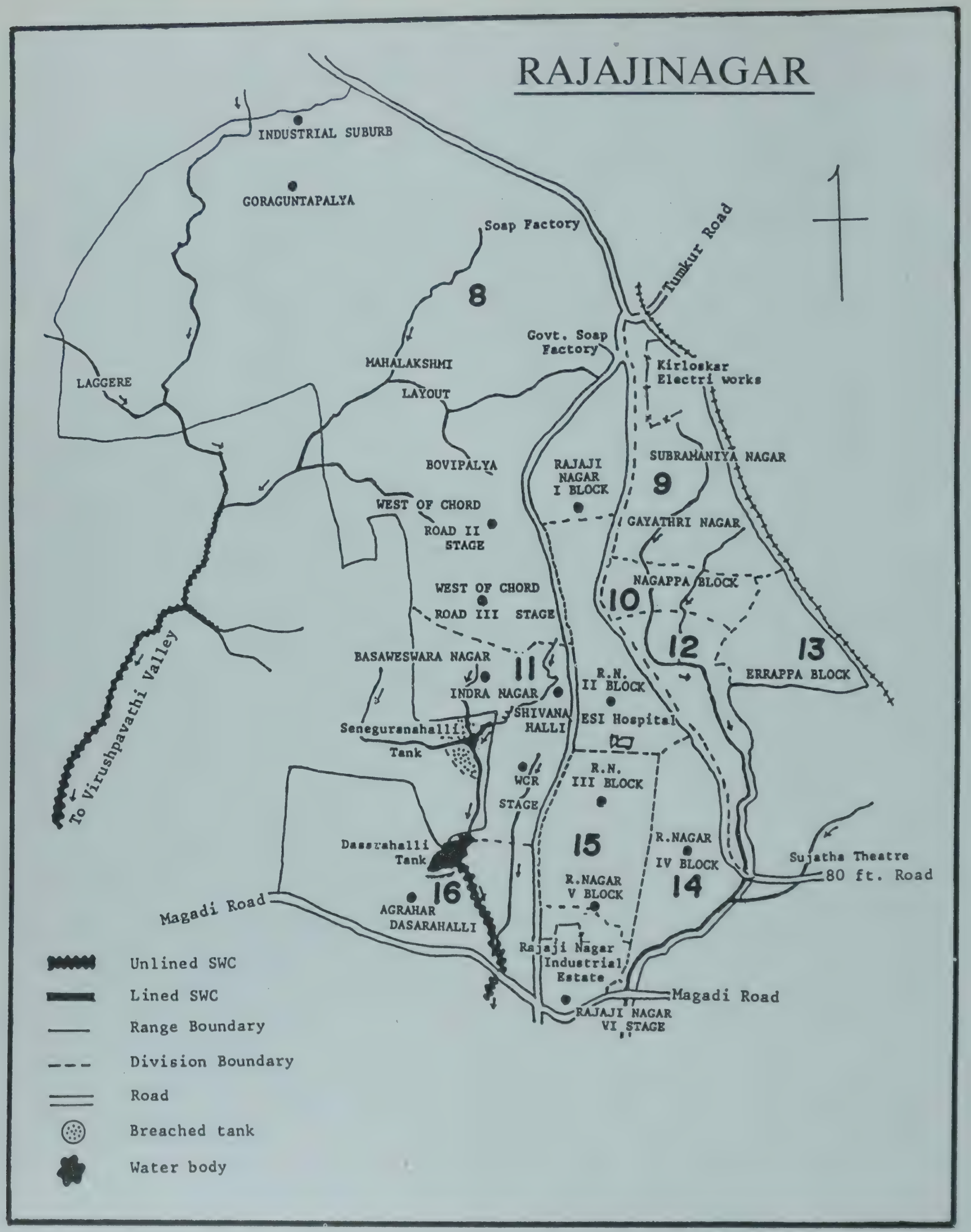
Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
12	Ramachandrapuram 4th Main Road–10th Sujatha Talkies Road	L	800	.2	160
”	In front of house No.163, 4th Main Road	Ce/U/UC	75	.5	37.5
”	Ramachandranpuram 4th Cross Road from 2nd Main to SW canal	L	600	.2	120
”	Ramachandranpuram 2nd Main Road to 4th Cross Road–Robertson Block	Ce/U/UC	400	.5	200
”	Maharani Kuvempu Road Nagar P.O. extn.	U/C	600	1	600
”	Maharani Kuvempu Road —5th Main Road	U/C	100	1	100
”	Maharani Kuvempu Road — 5th Cross	U/C	200	.5	100
”	Maharani Kuvempu Road — 6th Cross Rd.	U/C	700	1	700
”	L.N.Puram — 7th Cross Road	U/C	1200	1	1200
”	L.N.Puram — 8th Cross Road	U/C	1200	1	1200
”	L.N.Puram — 3rd Main	U/C	800	1	800
”	2nd Main — 7th Cross	U/C	1000	1	1000
”	3rd Main — 6th Cross	U/C	800	1	800
”	2nd Main — 4th Cross	U/C	700	1	700
”	2nd Main — 2nd Cross	U/C	1000	1	1000
”	2nd Main — 1st Cross	U/C	1000	1	1000
”	Rajaji Nagar 5th Block 1st & II Cross	U/UC	900	.7	630
”	Rajaji Nagar 17th A Main Road	U/UC	200	.7	140
”	Rajaji Nagar 11th Main Road	U/UC	800	.7	560
”	Rajaji Nagar 5th Block — 10th Main Road	U/UC	800	.7	560
”	Rajaji Nagar 17th B, C, E, F Main Roads	U/UC	2500	.7	1750

“If it is water, clean it (remove obstructions and vegetation); If it is standing water, move it (drain or fill); If it is moving water, compress it (reduce surface area); If it is hidden water, expose it (make it accessible to control and inspection)”.

—F.W. KNIPE (1953)

E 130
1650

RAJAJINAGAR



3.3. GANDHI NAGAR RANGE

Gandhi Nagar range is situated in the centre of the city and covers about 4 sq.km. area and has a population of 1,62,264 according to 1981 census. The whole area is divided into 6 divisions. The important localities included in this range are listed under respective division Nos. in Table 15.

Breeding Habitats:

Total breeding areas present in this range are summarized in Table 16.

Drains:

These measure about 112 km. in the range. (Table 17) Drains in Gopalapuram, Okalipuram, Srirampuram and Kalappa Block support *Cx. quinquefasciatus* breeding. Most of the drains were found blocked with garbage and silt. Breeding in these drains could be controlled by regular cleaning and desilting. The details of all drains with suitable recommendations are summarized in successive pages.

TABLE 15

Divisions and Localities in Gandhi Nagar range.

Division No.	Name of the locality
17	Laxminarayanapura, Gopalswamy Iyer Colony, Brahmapura, Dayanandanagar, Sriramapura, Pillamma Block and Saibabanagar.
18	Sriramapura, Gowthamnagar, Christian Colony, Vivekananda Colony, Swathanthrapalya, Hanumanthapura and Narayana Rao Colony.
19	Raja Mill, Platform Road, Nehru Park, Nehru Nagar, J.C.Road, 2nd Main Road, Sheshadhripuram, N.S.Iyengar Street, V.V.Giri Slum, Risaldar Park Road and Jai Chamarajendra Wudaiyar Nagar.
20	Brahmapura (Ramachandrapura), Kalappa Block, Robertson Block, Laxmipuram, Pillamma Block, Srirampura and Nagendra Garden.
21	Gopalapuram, Minerva Mill Road, Okhalipuram, Rajaji Nagar link Road, Railway Colony, Kasturi Nagar and Basaweswara Nagar.
22	Majestic Bus Stand, Subedhar Chatram Road and Kempe Gowda Circle.

TABLE 16

Measurements of various types of breeding habitats

Type of breeding habitat	Length (m)/No.	Surface area (m^2)
Storm water canals	4,600	4,600
Drains	1,12,700	56,350
Wells	333	400
Over head tanks	120	240

TABLE 17

Measurements of various Drains in Gandhi Nagar Range

Division No.	'U' Drain uncovered	'U' Drain covered	'L' Drain	Kutcha drain	Total length (in mt.)
17	9,600	10,400	17,500	Nil	37,500
18	4,360	5,300	3,860	300	13,820
19	1,050	4,800	6,000	Nil	11,850
20	2,960	7,800	6,580	Nil	17,340
21	9,960	2,450	4,330	300	17,040
22	Nil	15,200	550	Nil	15,750
Total	27,930	45,950	38,820	600	1,13,300

In Tables 18 and 19, lists of drains requiring yearly cleaning and engineering work are presented.

Control:

a. *Storm Water Canals*:

a.1. *Gayathri Nagar Main drain (1 km)*:

This drain originates in Harichandra Ghat in Gayathri Nagar (Div.9). The drain with an approximate length of 1 km. runs through Laxminarayanapura, Gopalswamy Iyer Colony, Okalipura, Hanumanthapura and finally joins the Malleswaram Main drain near Sujatha Theatre. The drain is found with thick growth of vegetation and silt. More number of latrines are also found directly connected to the drain.

Solutions:

1. Latrine connections should be diverted away from the canal.
2. Regular desilting and cleaning work should be carried out.

Subsidiary drains joining to Gayathri Nagar Main Drain:

a.2. *Bandappa Circle Drain*:

This runs as a box drain for about 100 mts. near Bandappa Circle whereafter it is open for nearly 500 mts. This drain actually runs through Dayananda Nagar and Ramachandrapura and finally joins the Main canal in Okalipuram. The floor of the drain is badly damaged with slabs apportioned. The drain has accumulated garbage, silt and vegetation, consequently providing breeding and resting sites for *Cx. quinquefasciatus*. In addition a number of latrines are also directly connected to the drain.

Solutions:

1. Engineering work should be undertaken to repair the damaged slabs in the floor of the drain.
2. Pending completion of engineering work regular cleaning and desilting should be carried out.
3. Latrine connections should be diverted away from the drain and connected to an underground sewerage system as early as possible.

a.3. *Kalappa Block Box Drain (0.5 km)*:

It runs as a box drain in Kalappa Block. Out of a total length of 500 mts. of the box drain, only 50 mts. is open. This portion is fully dumped with garbage. Since the cover-slabs are not properly placed, many gaps are formed between the slabs which provide entry points for mosquitoes. It has also been observed that people defaecated through the gaps between cover-slabs. The drain finally joins Okalipuram Main drain.

Solutions:

1. Since the whole drain is lined, it must be kept properly covered throughout.
2. Pending above work, proper cleaning work should be carried out in the open part and the cover slabs be properly replaced to eliminate gaps.

a.4. *Main drain from Malleswaram (2 km)*:

This drain runs through Jakkarayankere, Shastri Nagar, Okalipuram and Srirampuram and joins with Gayathri Nagar Main drain near Sujatha Theatre. The approximate length of the drain is 2 km. The drain has broken slabs which block the flow of water. Many latrine connections are found to lead directly into this drain. Except a small length of the drain near Okalipuram, the drain is in a very bad condition due to misplaced bed-slabs and accumulation of silt, garbage and vegetation.

Solutions:

1. The bed-slabs should be repaired and properly placed to maintain the flow of water.
2. Latrine connections to the underground sewerage system should be provided and opening in the drain must be avoided.
3. Regular cleaning and desilting work should be carried out.

a.5. **Subsidiary Drains joining with Malleswaram Drain:**

a.5.1. *Subsidiary drain near Krishna Mill (0.5 km)*:

The drain starts as a box drain from Bus Station area and later runs as an open drain with natural rocky bed with uneven floor for nearly 500 mts. This results in blocking of water here and there. Vegetation growth and silt deposit have also developed here and there which block free flow of water.

Solutions:

1. The rocky bed of the drain should be made even.
2. The vegetation and silt should be removed and insecticide should be sprayed in stagnant water bodies breeding mosquitoes.

a.5.2 *Kutcha drain from Railway Quarters (0.6 km)*:

This drain originates from Railway quarters and joins with Malleswaram Main drain near Shastri Nagar. The approximate length of the drain is 600 mts. The drain is totally unlined and vegetation block the water flow.

Solutions:

1. The drain must be lined.
2. Pending the above work, regular cleaning and deweeding should be carried out, along with spraying at regular intervals.

b. **Wells and overhead tanks:**

There are overall 333 wells and 120 overhead tanks. Breeding in potable wells can be reduced by releasing fish while breeding in unused wells can be controlled by applying the Expanded Polystyrene Beads, as mentioned earlier. The overhead tanks have to be covered completely.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	2
2.	Cleaning/ Deweeding	—	—	9
3.	Monitoring (Search and Evaluation)	—	3	—

WEEKLY SPRAY SCHEDULE FOR GANDHI NAGAR RANGE

MONDAY

Laximarayanapura, Gopalswamy Iyer Colony, Brahmapura, Dayananda Nagar, Srirampura and Subash Nagar.

TUESDAY

Brahmapura (Ramachandrapura), Kalappa Block, Lakshmipura, Pillamma Block and Nagendra Garden.

WEDNESDAY

Majestic Bus Station, Subhedar Chatram Road, Kempe Gowda Circle, Gopalapuram and Minerva Mill Road.

THURSDAY

Okalipuram, Rajaji Nagar link Road, Railway Colony, Kasturi Nagar and Basaweswara Nagar.

FRIDAY

Raja Mill, Platform Road, Nehru Park, Nehru Nagar, J.C.Road, 2nd Main, Seshadripuram, N.S. Iyengar Street and V.V.Giri slum.

SATURDAY

Risaldar Park Road, J.C.Wudaiyar Nagar, Sriramapuram, Gowtham Nagar, Christian Colony, Vivekananda Colony, Swatantrapalya, Hanumanthapura and Narayana Rao Colony.

SCHEDULE FOR CLEANING AND DEWEEDING OF DRAINS IN GANDHINAGAR RANGE

MONDAY – I & III Week

Area	*Length in mt.*
Brahmapura — 3rd Cross (right side)	250
Brahmapura — 3rd Cross (left side)	100
Lakshminarayanapura — 13th Cross	50
Srirampura — 2nd Main	300
Dayanandanagar — 3rd Cross	200
Dayanandanagar — 4th Cross	100
Dayanandanagar — 6th Cross	100
Total length	1,200

TUESDAY – I & III Week

Area	*Length in mt.*
Dayanandanagar — 5th Cross	300
Brahmapura — 2nd Main	500
Brahmapura — 3rd Main	400
Total length	1,200

WEDNESDAY – I & III Week

Area	*Length in mt.*
Brahmapura — 2nd Cross	400
Brahmapura — 3rd Cross	200
Gopalsamy Iyer Colony — 7th Cross	600
Total length	1,200

THURSADY – I & III Week

Area	*Length in mt.*
Dayanandanagar — 8th Cross	500
Dayanandanagar — 14th Cross	600
Total length	1,100

FRIDAY – I & III Week

Area	*Length in mt.*
Dayanandanagar — 7th Cross	400
Christian Colony — 2nd to 7th Cross	180
Swathanthrapalya — 6th Main	100
Swathanthrapalya slum — 7th Cross	500
Total length	1,180

SATURDAY – I & III Week

Area	*Length in mt.*
Vivekananda colony slum — 7th Cross	200
Indranagar slum (Backside)	180
Shastrinagar (side of Railway bridge)	300
Ramachandrapura — 4th Main	400
Total length	1,080

MONDAY – II & IV Week

Area	*Length in mt.*
V.V. Giri Colony	1,000
J.C. Wudiar Nagar — 1st Main	250
Total length	1,250

TUESDAY – II & IV Week

Area	*Length in mt.*
Kalappa Block — 1st Cross	400
Kalappa Block — 2nd Cross	200
Kalappa Block — 3rd Cross	200
Ramachandrapura — 1st Main	400
Total length	1,200

WEDNESDAY – II & IV Week

Area	*Length in mt.*
Brahmapura — 1st Main	200
Brahmapura — Conservancy lane	800
Total length	1,000

THURSDAY – II & IV Week

Area	*Length in mt.*
Gopalapuram — 4th Main (behind Minerva Mill)	300
Minerva Mill Road	500
Okalipuram — 1st Main	250
Railway Colony — 1st Main	100
Total length	1,150

FRIDAY – II & IV Week

Area	*Length in mt.*
Railway Colony — 3rd lane	100
Basaveswaranagar — 2nd Main	200
Basaveswaranagar — 1st Main	200
Minerva Mill Backside	100
Gopalapuram — 2nd Cross	400
Gopalapuram — 1st Cross	200
Total length	1,200

SATURDAY – II & IV Week

Area	*Length in mt.*
Leprosy Hospital to 6th Cross	800
Railway Quarters (towards shastrinagar)	300
Total length	1,100

INSECTICIDE REQUIRED/ANNUM:

Fenthion (82.5% EC)	...	25 lit.
M.L. Oil	...	100 lit.

Other:

Expanded Polystyrene beads	...	25 Kg.

Equipment:

Scrappers	...	10 Nos.
Spades	...	5 Nos.
Bonds	...	10 Nos.

TABLE 18

Drains which require one time cleaning and desilting

Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
17	Saibaba Nagar — 2nd Cross	L	600	.5	300
17.	Saibaba Nagar — 1st Cross	L	600	.5	300
17.	Saibaba Nagar — 8th Cross	Ce/U/C	300	1	300
17.	Saibaba Nagar — 8th Cross	Ce/U/UC	300	.5	150
17.	Saibaba Nagar — 6th Cross	Ce/U/UC	500	.5	250
17.	Saibaba Nagar — 5th Cross	Ce/U/UC	400	.5	200
17.	Saibaba Nagar — Conservency	L	400	.5	200
17.	Saibaba Nagar — 3rd Cross	Ce/U/UC	600	.5	300
17.	Saibaba Nagar — 4th Cross	L	400	.5	200
17.	Saibaba Nagar — 2nd Cross	L	500	.5	250
17.	Saibaba Nagar — 1st Cross	Ce/U/UC	600	.5	300
17.	Saibaba Nagar — 1st A Cross	L	400	.5	200
17.	Saibaba Nagar — 9th Main	Ce/U/C	800	1	800
17.	Saibaba Nagar — 7th Main	Ce/U/C	800	1	800
17.	Saibaba Nagar — 1st A Main	Ce/U/UC	400	.5	200
18.	Sri Ramapura, Neelagiri Papanna Block Slums — 6th Cross	Ce/U/UC	200	.5	100
18.	— do — — 7th Cross	Ce/U/C	200	.5	100
18.	— do — —5th to 7th Main	Ce/U/C	400	.5	200
18.	— do — — 7th A Cross	Ce/U/C	400	.5	200
18.	— do — — 8th Cross	Ce/U/C	150	.5	75
17.	Lakshminarayanapuram 3rd Cross Road	Ce/U/UC	1000	.3	300
17.	— do — — 13th Cross	Ce/U/C	50	.5	25
17.	— do — — 4th Main	Ce/U/UC	900	.5	450
17.	— do — — 12th Cross	L	1000	.2	200
17.	— do — — 11th Cross	Ce/U/UC	800	.3	240
17.	— do — — 10th Cross	Ce/U/C	1000	.5	500
18.	Sriramapura — 4th Cross	Ce/U/C	400	1	400
18.	— do — — 6th Cross	Ce/U/C	600	1	600
17.	Lakshminarayanapuram — 12th Cross	Ce/U/C	100	1	100
17.	— do — — 11th Cross	Ce/U/UC	200	.5	100
17.	— do — — 9th Cross	Ce/U/UC	300	.5	150
18.	Sriramapuram — 3rd Cross	Ce/U/C	1000	1	1000
17.	Dayananta Nagar — 1st Main	Ce/U/C	500	1	500
17.	— do — —Lane	Ce/U/UC	100	.5	50
17.	— do — — 1st Cross	L	400	.5	200
17.	— do — — II Cross	L	300	.5	150
17.	— do — —III Cross	L	300	.5	150
17.	— do — — V Cross	L	200	.5	100
17.	— do — — VI Cross	L	300	.5	150
17.	Pillamma Block — Conservency	L	300	.5	150
17.	— do — — 2nd Cross	L	300	.5	150
17.	— do — — 3rd Cross	L	200	.5	100
19.	N.S.Iyengar Street	Ce/U/C	200	1	200

Div. No.	Locality	Type of drains	Length	Width	Surface area in sq.mt.
19.	Platform Road upto Mysore Bangle works	Ce/U/C	500	1	500
19.	Risaldar Park Road	Ce/U/UC	100	.3	30
19.	2nd Main Road, Seshadripuram cutting	Ce/U/C	200	.5	100
19.	2nd Main road continuation upto Risaldar Colony	Ce/U/C	400	.5	200
20.	Ramachandrapura — 2nd Main Road	Box	800	1	800
20.	— do — — 3rd Main Road	”	800	1	800
20.	— do — — 4th Main Road	”	800	1	800
20.	Kalappa Block — 4th Cross	L.D.	200	1	200
20.	— do — — 1st Main	Box	800	1	800
20.	Ramachandrapura — 1st Main	”	1600	1	1600
20.	— do — — 4th Cross	U.D.	150	1	150
20.	— do — — 5th Cross	”	150	1	150
20.	— do — — 6th Cross	”	150	1	150
20.	— do — — 3rd Cross	”	150	1	150
20.	— do — — 2nd Cross	”	150	1	150
20	— do — — 1st Cross	”	150	1	150
20.	— do — — 1st Main	Box	200	1	200
20.	Sriramapura — 5th Main Road	”	1000	1	1000
20.	— do — — 1st Main Road	L.D.	180	1	180
20.	Saibaba Nagar — 3rd Cross	U.D.	100	1	100
20.	— do — — 3rd Cross	L.D.	160	1	160
20.	Minerva Mill — 6th Cross to Market	Box	400	1	400
20.	Minerva Mill — 5th Cross to Market	U.D.	300	1	300
20.	Gopalapuram — 1st Cross	U	2000	1	2000
20.	Okalipura — Rajaji Nagar Link Road	U	400	1	400
20.	— do — — 3rd Cross	U	600	1	600
20.	— do — — 1st Main Road	U.D.	1000	1	1000
20.	— do — — 1st Cross Road	”	600	1	600
20.	— do — — 2nd Cross Road	”	300	1	300
20.	— do — — 1st Cross to 3rd Cross	”	300	1	300
20.	— do — — 3rd Cross	”	500	1	500
20.	— do — — 4th Cross	”	300	1	300
21.	Okalipura — 3rd Main	U.D.	500	1	500
21.	— do — — 5th Main	L.D.	160	1	160
21.	Railway Colony 1st Lane	U.D.	100	1	100
21.	— do — 2nd Lane	U.D.	100	1	100
21.	Kasturi Bai Nagar — 1st Cross Road	”	150	1	150
21.	— do — 2nd Cross Road	”	140	1	140
21.	— do — 3rd Cross Road	”	60	1	60
21.	— do — 4th Cross Road	”	100	1	100
21.	Basaweswara Nagar — 1st Cross Road	L.D.	150	1	150
21.	— do — 3rd Main Road	”	150	1	150
21.	— do — 4th Main Road	”	150	1	150
21.	Kasturi Bai Nagar — 5th Main Road	SWC	300	1	300

TABLE 19

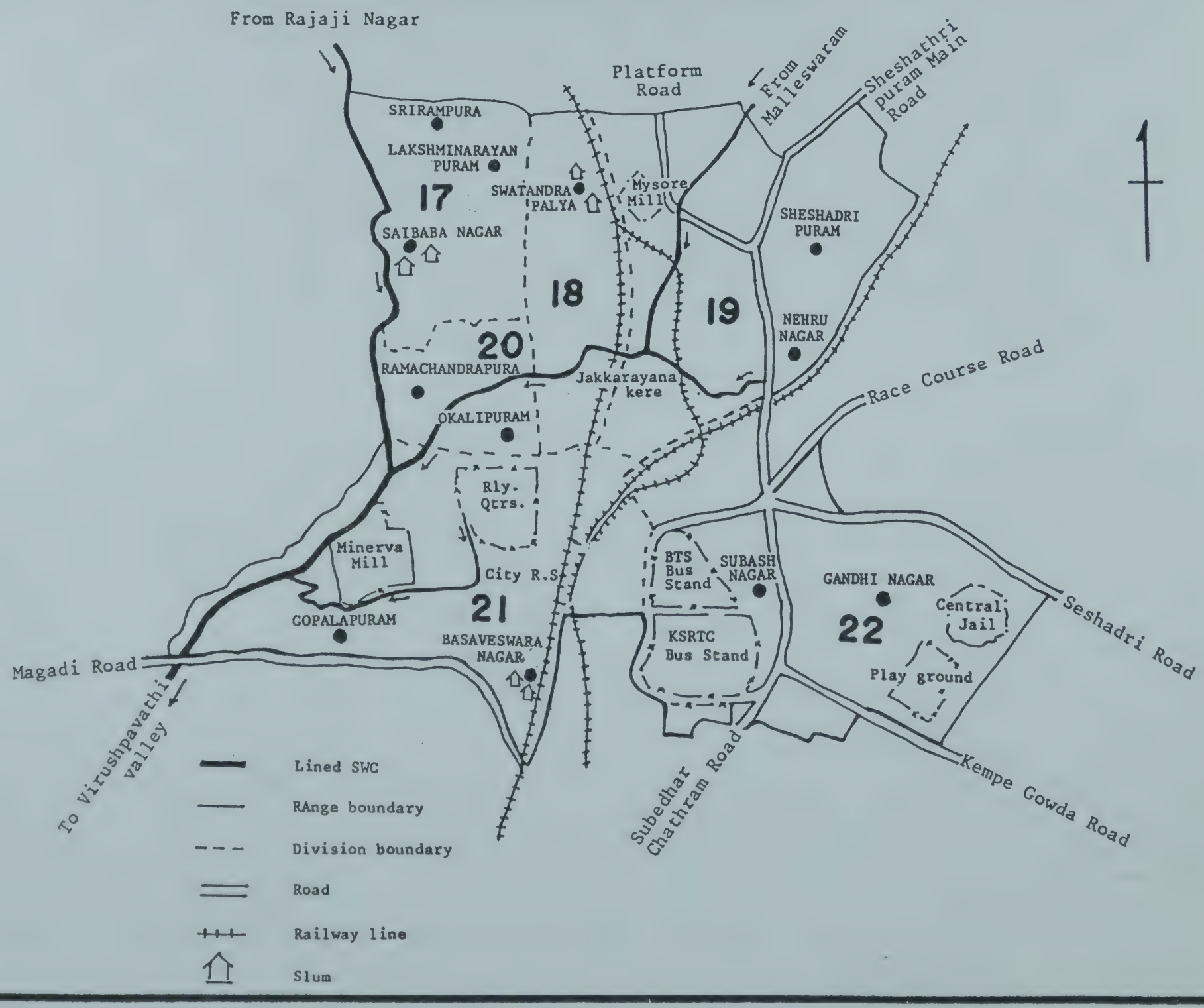
List of drains in Gandhi Nagar Range requiring Engineering work:

Div. No.	Locality	Shape & type of drain	Length	Breadth	Surface area (m^2)	Solution
17.	Brahmapura — 3rd Cross (Left)	Ce/U/UC	100	0.50	50	Regrade
17.	Brahmapura — 4th Cross	Ce/U/C	300	1.00	300	Regrade
18.	Shrirampura — 5th to 4th Main	Ce/U/C	30	0.50	15	Sealing
18.	Gowtham Nagar Slum	Ce/U/C	300	0.50	150	,,
18.	Neelagiri Pappanna Block Slum	Ce/U/C	2,000	1.00	2,000	,,
19.	Seshadripuram 2nd Main upto Risaldar Colony	Ce/U/C	800	0.50	400	Slab re-placement
21.	Minerva Mill backside	Ce/U/UC	100	0.70	70	Regrade
21.	Gopalapura 2nd Cross	Ce/U/UC	400	1.00	400	Regrade
21.	Gopalapura 1st Cross	Ce/U/UC	200	1.00	200	Regrade
21.	Leprosy Hospital to 6th Cross	Ce/U/UC	800	1.00	800	Regrade
21.	Railway Quarters (towards Shastri Nagar)	K – –	300	0.50	150	Regrade
22.	Race Course Lane (Near Majestic Bus Station)	Ce/U/C	500	1.00	500	Slab re-placement

"Planning has increasingly become the prerogative of elite professional and bureaucratic groups which are theoretically accountable to the citizen, but to which individual citizen has little access. More emphases are being placed on design aesthetics, fashion, technological innovation, engineering solutions and functional efficiency than the needs and satisfaction of the users of the planned environment".

—ANONYMOUS

GANDHI NAGAR



3.4. CHIKKAPET RANGE

The Chikkapet Range is situated in the centre of the town and covers approximately 3 Sq. km. area with a population of 1,15,149. The range is further divided into six divisions. Important localities included in this range are listed in Table 20.

TABLE 20

Divisions and Localities in Chikkapet range.

Division No.	Localities
23	Bellimutta Road, Anusunagar slum, TCM Rayan Road, Link Road and Cottonpet Main Road.
24	K.V. Street, A.S. Achar Road, OTC Road, Akkipet Police Road, Manavarthapet and Sowrastrapet Main.
25	Balaepet, Huriupet and Ganigarpet.
26	K.G. Extension, Cubbonpet, Cudumiapet and Upparpet.
27	Bakshi Garden, Siddarthanagar, Velmurugapuram, Anjanappa Garden, Binny Mill, Jayabheemanagar and Chaluvadipalya.
28	Cubbon pet, Akkipet, Sultanpet, Cottonpet, Tharaghupet and Sourashtrapet.

Breeding Habitats

Total breeding habitats and the area are summarized in Table 21.

TABLE 21

Measurements of various types of breeding habitats.

Type of breeding habitat	Length (in mt.)/Nos.	Surface are (in Sq.mt.)
Tank ...	1	5,000
Storm Water Canal ...	1,000	1,000
Drains ...	62,990	31,495
Cesspool ...	1	5,000
Cesspits ...	3	3
Wells ...	244	293
Overhead Tanks ...	176	352

Some of these breeding habitats are relatively more significant and therefore require to be elaborated further.

Drains:

Different kinds of drains run in the range are surveyed and measured. These are summarised in Table 22.

TABLE 22

Measurements of various drains in Chikkapet range.

Division No.	'U' Drain uncovered	'U' Drain covered	'L' Drain	Kutcha drain	Total length (in mt.)
23	30	3,100	1,520	0	4,650
24	1,200	13,040	0	0	14,240
25	0	11,120	0	0	11,120
26	0	2,500	0	0	2,500
27	4,900	3,200	3,750	460	12,310
28	100	13,350	3,900	20	17,370
Total Length	6,230	46,310	9,170	480	62,190

In Tables 23 and 24, lists of drains requiring engineering work and yearly cleaning are presented.

Control:

a. *Tank*:

Binny mill tank is the only tank in this range. This tank measures about 0.5 ha. It receives water mainly from the Binny Mill. This tank has accumulated a lot of garbage and therefore support heavy breeding. Water hyacinths are also found.

Solution:

Since the tank is not viable, the tank should be closed. Till that period, however, spraying should be done on the periphery and the water hyacinth should be gradually removed.

b. *Storm water canals*:

Bakshi garden canal: This canal starts from Bakshi garden (near Cottonpet Main Road). Till Dr. TCM Rayan Road, it runs as a box drain. This drain is not properly covered as the result of which garbage is being regularly dumped by the local people of the area. All 'U' and 'L' drains of Bakshi garden are found directly connected to this canal which runs as an open drain from Dr. TCM Rayan Road up to Binny Mill slum area. After Binny Mill, the canal is only Kutcha. The open Pucca drain is also found in bad condition due to broken bed slabs and damaged cunnette. Latrines are also directly connected to this drain.

Solutions:

i) Cunnette and bed-slabs should be properly constructed.

ii) Latrine connections should be diverted to a separate underground sewerage system.

iii) Regular cleaning and desilting work should be carried out.

In addition to the major storm water canal there are other drains which need desilting, deweeding and spraying/engineering work.

c. *Cesspits and cesspools*:

There is one cesspool which is found in Railway campus and supports heavy breeding of *Cx. quinquefasciatus*. It could be closed by silt removed from the drain. There are three cesspits in Bakshi Garden slum area. Since these pits stored sewage and sullage from the houses without proper drainage system the pits need regular spraying till proper drainage is constructed.

d. *Wells and overhead tanks*:

All the 244 wells should be regularly monitored for breeding status. Wherever breeding is found, fish should be released in the used wells and in the case of the unused wells, Expanded Polystyrene beads should be applied at the rate of 500 gm/m^2. There are 176 overhead tanks in this range and all these should be properly covered. The uncovered tanks should be emptied atleast once a week to avoid mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	2
2.	Cleaning/Deweeding	—	—	4
3.	Monitoring (Search and Evaluation)	—	6	—

WEEKLY SPRAY SCHEDULE FOR CHIKKAPET RANGE

MONDAY

Bakshi Garden, Siddartha Nagar and Velmurugapuram

TUESDAY

Anjanappa Garden, Binny Mill, Jayabheema Nagar and Cheluvadapalya.

WEDNESDAY

Bellimutta Road, Anusuya slum, Dr. TCM Rayan Road, Mills Road, Cottonpet Main Road and Cottonpet.

THURSDAY

Cubbonpet, Sultanpet, Tharagupet and Sourashtra pet.

FRIDAY

Balaepet, Huriupet, Ganigarpet, K.V. Street, Achar Street, OTC Road and Akkipet Police Road.

SATURDAY

Manavarthapet, Sourashtrapet Main, K.G. Extension, Cubbonpet, Cudumipet and Upparpet.

SCHEDULE FOR CLEANING AND DEWEEDING OF DRAINS IN CHIKKAPET RANGE

MONDAY – I & III Week

Area	*Length (in mt.)*
Anusuyanagar slum — infront of Binny Mill, near Srinivasa Agencies (Railway Campus)	30
Cottonpet — 2nd Cross	100
Bakshigarden slum — 1st Main	300
Bakshigarden slum — 5th Main	100
Total length	530

TUESDAY – I & III Week

Area	*Length (in mt.)*
Bakshigarden slum — 2nd Main 3rd Cross	100
Bakshigarden slum — 3rd Cross	200
Chaluvadipalya — 1st Cross	200
Total length	500

WEDNESDAY – I & III Week

Area	*Length (in mt.)*
Bakshigarden slum — 3rd Cross	400

THURSDAY – I & III Week

Area	*Length (in mt.)*
Bakshigarden slum — 1st Cross	400

FRIDAY – I & III Week

Area	*Length (in mt.)*
Chaluvadipalya — 5th Cross	250
Bakshigarden slum — 3rd Main	200
Total length	450

SATURDAY – I & III Week

Area	*Length (in mt.)*
Chaluvadipalya — 4th Cross	250
Chaluvadipalya — 2nd Cross	200
Total length	450

MONDAY – II & IV Week

Area	*Length (in mt.)*
Velmurugapuram — 1st lane	50
Velmurugapuram — 2nd lane	30
Velmurugapuram — 3rd lane	30
Velmurugapuram — 3rd A' lane	30
Velmurugapuram — 4th lane	50
Velmurugapuram — 5th lane	50
Jayabheemanagar — 1st Cross	250
Total length	490

TUESDAY – II & IV Week

Area	*Length (in mt.)*
Jayabheemanagar — 2nd Cross	250
Jayabheemanagar — 3rd Cross	200
Total length	450

WEDNESDAY – II & IV Week

Area		*Length (in mt.)*
Jayabheemanagar — backside 1st Cross		80
Anjanappa garden — 6th Cross		100
Siddarthanagar slum — 2nd Cross		200
	Total length	380

THURSDAY – II & IV Week

Area		*Length (in mt.)*
Siddarthanagar slum — 3rd Cross		200
Siddarthanagar slum — 4th Cross		200
	Total length	400

FRIDAY – II & IV Week

Area		*Length (in mt.)*
Siddartha nagar — 5th Cross		200
Siddartha nagar — 6th Cross		200
	Total length	400

SATURDAY – II & IV Week

Area		*Length (in mt.)*
Siddartha nagar — 7th Cross		200
Chaluvadipalya — 3rd Cross		300
	Total length	500

INSECTICIDE REQUIRED/ANNUM

1.	Fenthion (82.5% EC)	...	...	25 lit.
2.	M.L. Oil	...	...	100 lit.

Other

	Expanded Polystyrene Beads	...	...	25 Kg

Equipments

1.	Scrappers	...	...	20 Nos.
2.	Spades	...	...	10 Nos.
3.	Bonds	...	...	20 Nos.

TABLE 23

List of Drains in Chikkapet Range Requiring Engineering Solution.

Div. No.	Locality	Shape & type of drain	Length	Width	Surface area (m^2)	Solution
24.	Akkipet — Main Road	Ce/U/C	1,500	1.00	1,500	proper Sealing
”	Akkipet — Muni Ramanna Cross lane	”	100	1.00	100	” ”
”	Akkipet — Setty Muddanna lane	”	400	0.70	280	” ”
”	Akkipet — Reddy Buchanna lane 1st Cross	”	400	0.70	280	” ”
25.	Balepet — Thulasi thottam Road	Ce/U/C	100	1.00	100	proper Sealing
”	Balepet — Main Road	Ce/U/C	500	1.00	500	” ”
”	Balepet — BVK Iyengar Road	”	500	1.00	500	” ”
”	Balepet — Rangaswamy Temple St. upto BVK Iyengar Rd.	”	300	1.00	300	” ”
”	Balepet — from BVK Iyengar road to Avenue Road	”	500	1.00	500	” ”
”	Balepet — Avenue Road	”	400	1.00	400	” ”
”	Balepet — Jungam Maistry Lane	”	100	0.50	50	” ”
”	Balepet — Venkataramana Swamy St.	”	200	1.00	200	” ”
27.	Bakshigarden slum — I Main	Ce/U/UC	300	0.50	150	Regrading
”	— do — — 5th Main	Ce/U/UC	100	0.50	50	”
”	— do — — III Cross	”	600	0.50	300	”
”	— do — — 1st Cross	”	400	0.50	200	”
”	— do — — 3rd Main	”	200	0.50	100	”
”	Cottonpet Main Road to Rayan Rd.	”	500	3.00	1,500	”
”	Velmurugapuram — 1st & 2nd Main	Ce/U/C	400	0.70	280	”
”	V.M. Puram — Tamil Kannada Primary School	”	50	1.00	50	”
”	Jayabhemanagar slum —— 1st Cross	Ce/U/UC	250	0.50	125	”
”	— do — — 2nd Cross	”	200	0.50	100	”
”	Anjanappa garden slum — 6th Cross	Ce/U/UC	100	0.70	70	”
”	— do — — 6th Cross	Culvert	10	0.70	7	”

Div. No.	Locality	Shape & type of drain	Length	Width	Surface area (m^2)	Solution
”	Sidharthanagar slum— 2nd Cross	Ce/U/UC	200	0.50	100	”
”	— do — — 3rd Cross	”	200	0.50	100	”
”	— do — — 4th Cross	”	200	0.50	100	”
”	— do — — 5th Cross	”	200	0.50	100	”
”	— do — — 6th Cross	”	200	0.50	100	”
”	— do — — 7th Cross	”	200	0.50	100	”

TABLE 24

Drains which require one time desilting and deweeding

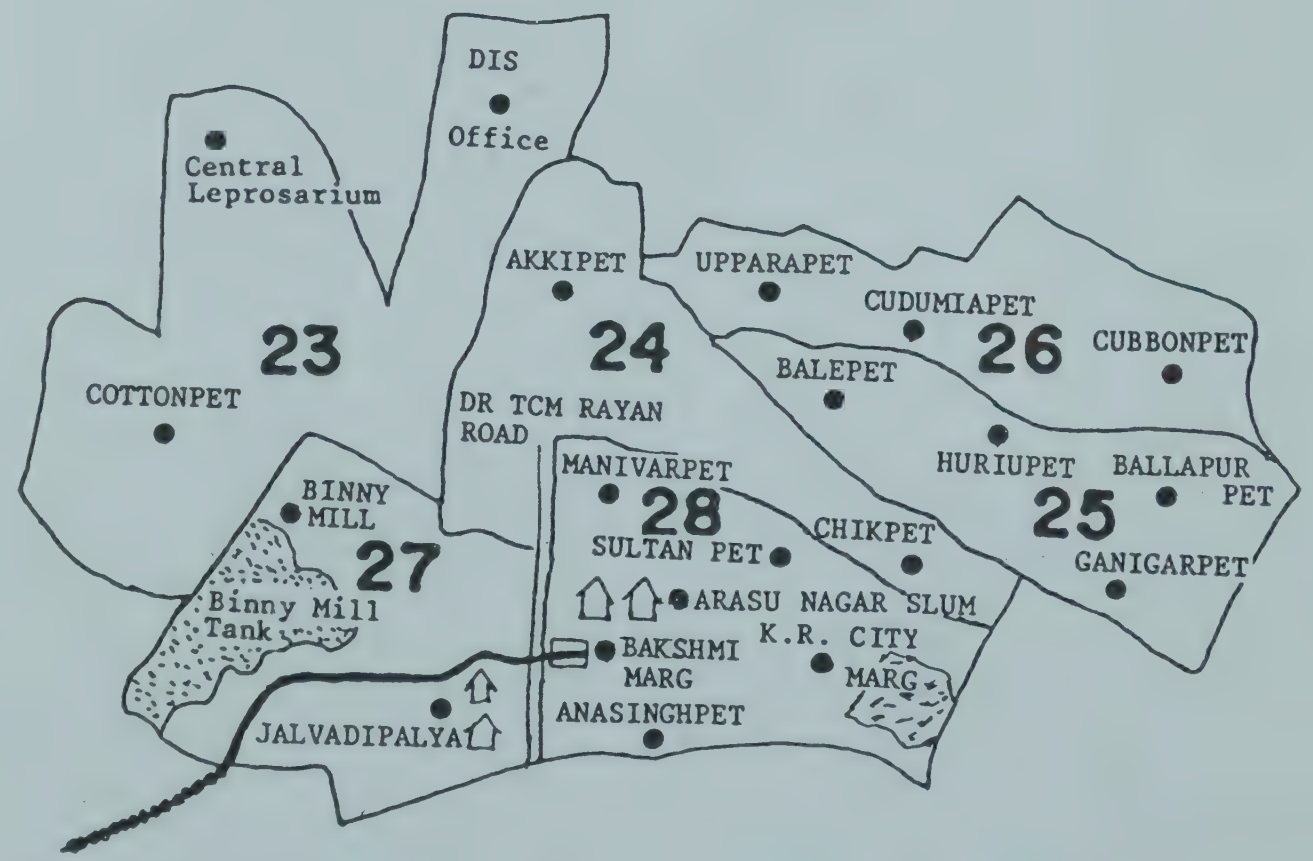
Div. No.	Locality	Type of drains	Length	Width	Surface area (m^2)
23	*Cottonpet Main Road*				
”	Naragunda Devaramutha Lane to Circle, Binny mill Road	Ce/U/C	500	1	500
23.	A.S. Char Street, Sultanpet main to OTC street	Ce/U/C	300	1	300
”	K.V. Temple Road to A.S.Char St.	Ce/U/C	400	1	400
”	A.S. Char Road to old Tharugapet main to Avenue Road	Ce/U/C	600	1	600
”	Old Tharugapet, IVth Cross	Ce/U/C	100	1	100
”	OTC Road to Old Tharugapet cross, Avenue Main	”	260	1	260
	No.2, Avenue Road Chowk to K.V. Temple St.	”	400	1	400
25	*Balepet* — Lakshman Rao Road upto BVK Iyengar Road	Ce/U/C	200	1	200
”	Gopalkrishna Temple Street	”	150	1	150
”	Uttaradimutt lane	”	400	1	400
”	G.K. Line	”	100	.5	50
27.	Bellimutta Road	Ce/U/C	600	1	600
”	Old pension Mohalla Mysore Road	”	700	1	700
”	Velmurugapuram beerboundary Taddy shop road	”	600	1	600

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)
28.	*Akkipet*				
”	Mysore Road (K.R.Market to Chowk)	Ce/U/C	300	1	300
”	Bashyam Road	”	600	1	600
”	Carpenter Byrappa Road	”	300	1	300
”	Police Road	”	600	1	600
”	Akkipet 1st Cross	”	550	1	550
”	Arcot Srinivasachar Road	”	500	1	500
”	M, Mudaliar Road	”	500	1	500
”	Mazid Road	”	500	1	500
”	Beeredevara Temple Road	”	300	1	300
”	Panchalammu Lane 4th Cross	”	150	1	150
”	Gundappanna Road	”	600	1	600
”	Old Tharugapet Cross	”	200	1	200
”	‘A’ Cross	”	200	1	200
”	Police ‘E’ Cross	”	400	1	400
”	Ramalinghpet	”	600	1	600

“It was not a campaign that introduced new techniques, but a campaign that illustrated what could be accomplished by application of already known techniques, and applying them more vigorously than ever before, coupled with political sagacity and bulldog tenacity”.

WILBUR DOWNS 1981

CHIKKAPET RANGE



3.5. BINNYPET RANGE

This range is situated in the south-eastern side of the city and covers approximately 10 Sq.km. area with a population of 3,03,211. This range is divided into nine divisions for mosquito control and sanitation. Various localities under the respective divisions in the range are mentioned in Table 25.

Breeding Habitats:

Various breeding habitats existing in the range were surveyed and have been summarized in the table 26:

Some of these breeding habitats are relatively more significant from the viewpoint of mosquito breeding and therefore, are further elaborated below.

Drains:

Sources of drains exist in the range. These drains were classified and measured. A summary of the characteristics of these drains is given below.

TABLE 25

Divisions and Localities in Binnypet range.

Division No.	Name of the locality
29	M.C. Layout, Babuji Nagar, Govindaraj Nagar, A.K. Colony. Central Excise layout, Amarjyothi Nagar, KHB Colony, Thimmanahalli slum, Prashath Nagar, Athiguppe, RPC layout and Maranahalli.
30	Manjunathanagar, Cholurpalya, Vijayanagar II Stage, Vijayanagar Extension, Hosahalli village and Vijayanagar II Stage — Pipeline.
31	Kempapura Agrahara, Mariyappana palya and Magadi Road.
32	Mariyappanapalaya, Margandeswara nagar & Binny Mill Quarters.
33	Hoseguddahalli, Hindu Burial ground slum, Vinayaka nagar, Manjunath layout, Samanna nagar, Devaraj Urs slum, Padarayanapura and West Padarayanapura.
34	Renganatha Colony, V. S. Garden, Jagajeevanram Nagar, Rayapuram and Padarayanpura.
35	Padarayanapura and Jagajeevanram Nagar.
36	Byatrayanapura [New layout], Deepanjali Nagar, Timber yard layout and Iyennasetty layout.
37	Valmikinagar, Vittal Nagar, Azad Nagar, Baktha Markanteya layout, Ramachandra Agrahara and Kasturiba Nagar.

TABLE 26

Measurements of various types of breeding habitats

Type of breeding habitat	Length (m)/No.	Surface area (Sq.mt.)
Storm water canal	29,000	29,000
Cesspits	55	55
Cesspools	26	3,300
Wells	122	146
Overhead Tanks	330	660
Wet Cultivation	2	5,00,000
Quarry Pits	2	2,550

TABLE 27

Measurements of various drains in Binnypet range.

Div. No.	Pukka Drains (m) Covered	Pukka Drains (m) Uncovered	'L' drain	Kutcha drain	Total length of the drains (m)
29	5,800	95,510	15,960	2,930	1,20,200
30	0	1,25,140	8,850	3,500	1,37,490
31	4,350	34,700	11,150	100	50,300
32	1,400	14,160	11,230	101	26,891
33	8,800	33,770	49,675	2,250	94,495
34	1,780	8,000	17,430	1,200	28,410
35	5,750	7,400	10,150	—	23,300
36	1,550	12,300	12,000	1,195	27,045
37	11,890	19,750	13,620	320	45,580
Total	41,320	3,50,730	1,50,065	11,596	5,53,711

In Tables 28 and 29, lists of drains requiring engineering work and yearly cleaning are presented.

Control:

a. *Storm water canals*:

a.1. *Maranahalli storm water canal* (3 Km.):

It starts from Maranahalli and runs through KSRTC Depot (West Chord Road), Vijayanagar II Stage and joins with Rajajinagar storm water canal near Mysore Road near AMCO Factory. This is an unlined canal upto KSRTC Depot and the water flow is found blocked with silt and vegetation. In the lined portion of the drain also lot of silt and vegetation growth favours mosquito breeding because of water stagnation.

Solutions:

1. The unlined part of the canal should be lined.
2. Desilting and deweeding should be carried out regularly.
3. Till the drain is lined and desilted completely, the unlined part should be sprayed with Fenthion at 1 ppm dose.

a.2. *Vijayanagar II stage canal (1.5. Km.)*:

This canal starts from Vijayanagar 5th Main and runs through 6th Main, 11th Main and joins with Hosahalli Main Canal near 7th Main. The canal is found with completely damaged bed slabs at many points due to which water stagnates and breeding occurs.

Solutions:

1. Engineering department should properly construct the drain bed with a cunette.
2. Desilting work should be carried out regularly.

a.3. *Hosahalli canal (3 Km.)*:

It starts from Hosahalli and runs through Vijayanagar 1st stage 10th Main Road, 9th Main Road, 8th Main Road, 7th A Main Road and joins the Rajajinagar main storm water canal at Bapujinagar. This drain is a covered drain from Hosahalli to Vijayanagar 1st Stage for about 1.5 Km. and from 9th Main Road to 8th Main Road of Vijayanagar 1st Stage. The drain is found fully covered with vegetation growth and silt.

Solution:

1. The drain should be desilted and deweeded regularly.

a.4. *Dasarahalli outlet drain (2 Km.)*:

This drain is originating from Rajajinagar Range and runs through Magadi Road, Manjunathanagar and finally joins with Rajajinagar main storm water canal at Cholurpalaya. The drain is found blocked with silt and garbage. More number of latrine connections are found to get entry into this drain.

Solution:

1. Latrine connections should be diverted to underground sewerage system.
2. Desilting and cleaning should be carried out regularly.

a.5. *Magadi and Chord Road Layout storm water canal (1.5 Km)*:

This canal starts from Govindaraj Nagar (M.C. Layout) and joins with Dasarahalli outlet drain at Vijayanagar II stage near Saraswathi Iron Foundry. This drain is fully blocked with heavy silt and growth of vegetation.

Solution:

1. Desilting and deweeding should be carried out regularly.

a.6. *Padarayanapura main drain (1.5 Km.)*:

It starts from Padarayanapura near Hosahalli Main Road Bridge and runs through Manjunath layout, New Guddadahalli, Samannanagar and joins the Rajajinagar Main storm water canal at Bapujinagar. This drain is in a very bad shape due to damaged bed-slabs. Garbage dumping by the people living in surrounding areas and silt and vegetation growth make water stagnation at many points. Slaughter houses beside the canal also pollute the drain by letting all animal wastes and other unwanted materials directly into the drain.

Solutions:

1. The drain bed should be properly constructed with a cunette.
2. Latrine connection should be diverted away from the canal to an underground sewerage system.

3. Slaughter houses should not be allowed to dump the wastes in this canal and the Bangalore City Corporation should enforce the proper Act in this connection.
4. Regular desilting should be carried out.

a.7. *Subsidiary drains of Padarayanapura Main Canal.*

There are two drains coming from Hindu Burial ground and the Dolegate and joins the Padarayanapura main storm water canal. These drains are elaborated below:

a.7.1. *Hindu Burial Ground Drain (1 Km.)*:

It starts from Hindu Burial Ground slum and runs through Vinayakanagar and New Guddadahalli. It joins the Padarayanapura Main drain at 7th Cross. The drain is heavily deposited with silt.

Solution:

1. The drain should be desilted regularly for the proper flow of water.

a.7.2. *Dolegate Drain (1 Km.)*:

This drain starts from Dolegate at Mysore Road and runs through Pipeline road and New Guddadahalli and finally joins the Padarayanapura Main storm water canal. This is a Kutcha drain. Vegetation growth blocks the free flow of water which in turn favours heavy breeding of *Culex quinquefasciatus* throughout whole stretch of the drain.

Solution:

1. The drain should be constructed as a lined drain.
2. Pending regular channelization, spraying with fenthion at the rate of 1 ppm dose should be carried out regularly.

a.8. *Rajajinagar Main Storm water canal (7 Km.)*:

The canal comes from Rajajinagar range and runs through Magadi Road, Kempapura Agrahara, Cholurpalaya, Vidyaranya nagar, Bapujinagar, Mysore Road, Byatrayanapura and Culminates in Virushpavathivalley. This is a Kutcha canal. Due to heavy vegetation growth on the edges, water stagnates and breeding occurs heavily.

Solution:

1. This canal should be made as lined canal.
2. Pending regular channelization spraying should be carried out with fenthion at the rate of 1 ppm dose.

a.9. *Kempabhudi outlet canal (2 Km.)*:

This canal starts from Kempabhudhi tank and runs as Kutcha canal throughout its stretch. It runs through the Ragavendra nagar, Kasturiba nagar, Timber yard layout and Byatrayanapura. It joins the Rajaji nagar main storm water canal at Byatrayanapura. Because of heavy growth of vegetation and silt, the canal is blocked at so many points which lead to heavy breeding of mosquitoes.

Solution:

1. This canal should be constructed as a lined canal.
2. Pending regular channelization, spraying should be carried out.

a.10. *Azad Nagar Drain (1 Km.)*:

This drain starts from Azad Nagar and runs through Vittal Nagar, Valmiki Nagar and then joins the Kempabhuthi tank outlet canal at Valmiki Nagar. This is a lined drain but due to broken bed slabs water stagnates thus increasing mosquito breeding potential. In many places latrine connections are also found directly connected to this drain.

Solutions:

1. Engineering Department should construct proper drain bed with a cunette.
2. All latrine connections should be diverted to nearby underground sewerage system.
3. Regular desilting work should be carried out.

a.11. *Jagajeevanram Nagar Canal (1.5. Km.)*:

This canal starts near Binny Mill Stores (Tank bund Road) and runs through Jagajeevanram nagar 1st Main, 3rd Main, Venkatasamy Garden and joins with Rajaji Nagar Main Storm water canal near railway line. This drain is dumped with heavy garbage. Heavy silt deposition is also observed. Latrines are directly connected to this drain.

Solutions:

1. Latrine connections should be diverted to a nearby underground sewerage system.
2. Regular cleaning and desilting should be carried out.

a.12. *Bakshigarden slum canal (2 Km.)*:

This canal starts from Chikkapet range. In this range, it runs through Binnymill quarters, railwayline, Mariyappanpalaya, Kempapura Agrahara and joins with Rajaji Nagar Main storm water canal at Cholurpalaya. This canal is found in very bad condition due to heavy garbage dumping and deposition of silt. Besides, latrines are connected directly to the canal which pollute and make it ideal for the prolific breeding of *Culex quinquefasciatus*.

Solutions:

1. Latrine connections should be diverted to a nearby underground sewerage system.
2. Desilting work should be carried out regularly.

a.13. *Kempapura Agrahara drain (1 Km.)*:

It starts from Kempapura Agrahara 1st cross and runs upto 12th cross and then joins with Bakshigarden slum drain. Water flow is blocked with garbage and heavy silt deposition. Latrine connections also pollute the drain water.

Solutions:

1. Regular desilting and garbage removal should be carried out.
2. Latrine connections should be diverted to an underground sewerage system.

b. *Cesspits and cesspools*:

There are altogether 55 cesspits and 26 cesspools (3300 Sq.m) in the range. There are three large cesspools in Thimmanahalli, Maranahalli (near Mudalapalya) and Deepanjali nagar. These cesspools receive sullage and sewage from the nearby areas. Both these breeding habitats should be, as a principle, filled up with some silt etc. collected from the drains under cleaning. However, pending this job, these must be regularly sprayed with fenthion at the recommended dose of 1 ppm. (Tables 30 and 31.)

c. *Wells and overhead tanks*:

There are 122 wells and 330 overhead tanks in this range. Breeding in used wells can be controlled by releasing fish and by the application of the Polystyrene beads (at the rate of 500 gm/Sq.m.) in the disused wells. The overhead tanks must invariably be covered.

d. *Wet Cultivation*:

Grass cultivation using sewage water is practiced in this range over approximately 50 ha of land. Often mosquito breeding is found to occur in small shallow pools formed indiscriminately in the grass fields. These pools should be levelled up. However, pending this work, these should be regularly sprayed with fenthion at the rate of 1 ppm. dose.

e. *Quarrypits*:

Only two quarry pits are present. Since the water is accumulated in these along with the vegetation these might form potential breeding ground in future. As a permanent measure, these must be filled (Table 32).

STAFF DEPLOYMENT

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	2	—	48
2.	Cleaning/Deweeding	2	—	54
3.	Monitoring (Search and Evaluation)		5	—

INSECTICIDES REQUIRED/ANNUM:

1.	Baytex	...	1000 Lit.
2.	M.L.Oil	...	4000 Lit.

Others:

Polystyrene beads	...	100 Kg.

Equipments required:

1.	Spades	...	22
2.	Bonds	...	22
3.	Scrappers	...	20

SPRAY SCHEDULE FOR BINNYPET RANGE

MONDAY

M.C. Layout, Babuji Nagar, Govindaraj Nagar, A.K.Colony, Central Excise Layout, Amarjyothi Nagar, KHB Colony, Thimmanahalli slum, Prashath Nagar, Athiguppe, RPC Layout and Maranahalli.

TUESDAY

Manjunathanagar, Cholurpalya, Vijayanagar II Stage, Vijayanagar Extension, Hosahalli village and Vijayanagar II Stage — Pipeline.

WEDNESDAY

Kempapura Agrahara, Mariyappanapalya and Magadi Road, Mariyappanapalaya, Margandeswara Nagar and Binny Mill quarters, Hoseguddahalli, Hindu Burial ground slum and Vinayaka Nagar.

THURSDAY

Manjunath Layout, Samanna Nagar, Devaraj Urs slum, Padarayanapura and West Padarayanapura, Renganatha Colony, V.S.Garden, Jagajeevanram Nagar, Rayapuram and Padarayanapura.

FRIDAY

Padarayanapura and Jagajeevanram Nagar, Byatrayanapura (New layout), Deepanjali Nagar, Timber yard layout and Iyennasetty layout.

SATURDAY

Valmikinagar, Vittal Nagar, Azad Nagar, Baktha Markanteya layout, Ramachandra Agrahara and Kasturiba Nagar.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN BINNYPET RANGE

MONDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	M.C. Layout — Side of Malathesa Vidhaya sangha lane	200
2.	M.C. Layout — 4th Main 5th Cross	500
3.	Bapujinagar — 2nd Main Road	800
4.	Bapuji nagar Slum	300
5.	Bapuji nagar — 1st Cross	600
6.	Bapuji nagar — 3rd Main	800
7.	Bapuji nagar — 2nd Cross A lane	400
8.	Bapuji nagar — 2nd Cross B lane	300
9.	Bapuji nagar — 2nd Cross C lane	300
10.	Bapuji nagar — 2nd Cross D lane	300
11.	Bapuji nagar — 12th Cross	100
12.	KHB Colony — 2nd Cross	400
13.	KHB Colony — 3rd Cross	400
14.	Govindarajnagar — 24th Cross	800
15.	Govindarajanar — 14th Main Road	400
16.	RPC layout	400
17.	M.C. Layout — from 8th main to 22nd main	1,200
18.	Govindarajnagar 3rd Cross Road, (Side of Ganesha Medicals)	200
19.	Vijayanagar Extension — Hosahalli slums	50
20.	Vijayanagar Extension — Hosahalli slums	50
21.	Vijayanagar Extension — Hosahalii slums	100
	Total length	8,600

TUESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Manjunathanagar — Main Road	500
2.	Manjunathanagar — 2nd Cross	500
3.	Manjunathanagar — 3rd Cross	400
4.	Manjunathanagar — 4th Cross	400
5.	Manjunathanagar — 5th Cross	500
6.	Manjunathanagar — 6th Cross	1,100
7.	Manjunathanagar — 8th Cross	500
8.	Manjunatha nagar — 9th Cross	100
9.	Cholurpalya — 6th Cross	120
10.	Cholurpalya——7th, and 8th Cross	500
11.	Vijayanagar — Pipeline — II Stage — 13th Cross	800
12.	Vijayanagar — Pipeline — II Stage — 11th Cross	800

Sl.No.	*Locality*	*Length (m)*
13.	Vijayanagar — Pipeline — II Stage — 10th Cross	400
14.	Vijayanagar — Pipeline — II Stage — 7th Cross to 11th Cross	200
15.	Cholurpalya — 1st Cross	100
16.	Cholurpalya — 1st 'A Main Road	300
17.	Cholurpalya — 3rd Cross	600
18.	Cholurpalya — 4th Cross	300
19.	Cholurpalya — 5th Cross	200
	Total length	8,320

WEDNESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Cholurpalya — (Magadi Road) 1st Main	1,600
2.	Maranahalli — 2nd Main	50
3.	Maranahalli — 2nd Main	200
4.	Maranahalli — 2nd Cross	150
5.	Maranahalli — 15/4 near Muniamma house	30
6.	Maranahalli — 1st Main	100
7.	Maranahalli — 1st Main	100
8.	Maranahalli — Right side of Maheswaramma Temple	150
9.	Vijayanagar — II Stage — RPC Layout 7th Cross to 7th A Cross	30
10.	Mariyappanapalya — 1st Cross	400
11.	Mariyappanapalya — 4th Cross	400
12.	Mariyappanapalya — 4th Main	400
13.	Margandeswaranagar	50
14.	Margandeswaranagar — Anjaneya garden to Railwayline	300
15.	Binny Mill Quarters — 1st Main	800
16.	New Guddadahalli — 1st Cross	200
17.	New Guddadahalli — Conservency lane	200
18.	New Guddadahalli — 2nd Cross	300
19.	New Guddadahalli — 1st Main	800
20.	New Guddadahalli — 3rd Cross	800
21.	New Guddadahalli — 3rd Main	200
22.	New Guddadahalli — 2nd Main	200
23.	New Guddadahalli — 4th Cross	800
24.	New Guddadahalli — 5th Cross	300
	Total length	8,560

THURSDAY – I & III Week

Locality	*Length (m)*
New Guddadahalli — 5th Cross	300
New Guddadahalli — Conservency lane	600
New Guddadahalli — Conservency lane	300
New Guddadahalli — 6th Cross	300
New Guddadahalli — 6th Cross	300
New Guddadahalli — 7th Cross	600
New Guddadahalli — A Street	400
New Guddadahalli — Conservancy lane	400
New Guddadahalli — 1st Main	800
New Guddadahalli — 1st Main	300
New Guddadahalli — 2nd Main	800
New Guddadahalli — 3rd Main	300
Devaraj Urs Nagar — 8th Cross Road	100
Devaraj Urs Nagar — 11th Main	100
Devaraj Urs Nagar — (Near Middle School) 9th Cross	150
Devaraj Urs Nagar — 7th Main	20
Devaraj Urs Nagar — 17th Main	200
Devaraj Urs Nagar — 15th Main	200
Devaraj Urs Nagar — 14th Cross	200
Devaraj Urs Nagar — 15th Cross	200
Devaraj Urs Nagar — 1st Main	100
Devaraj Urs Nagar — 3rd Main-Conservancy	200
Devaraj Urs Nagar — 7th Cross Road	400
Devaraj Urs Nagar — 13th Cross Road	400
Vinayakanagar — 6th Cross	400
Vinayakanagar — 7th Cross	200
Vinayakanagar — 8th Cross	200
Total length	8,470

FRIDAY – I & III Week

Locality	*Length (m)*
Vinayakanagar — Conservancy lane	400
Vinayakanagar — 5th Main	800
Vinayakanagar — 4th 'A' Cross	600
Vinayakanagar — 5th Cross	600
Vinayakanagar — 4th Cross	600
Vinayakanagar — Nehru Street	300
Vinayakanagar — Near Pipeline	200
Vinayakanagar — Nehru Street	500

Locality	*Length (m)*
Vinayakanagar — 3rd Cross	500
Vinayakanagar — 3rd Cross	500
Vinayakanagar — 5th Cross	400
Vinayakanagar — Conservancy lane	400
Vinayakanagar — Conservancy lane	400
Vinayakanagar — 2nd Cross	800
Vinayakanagar — 7th 'B' Cross	200
Vinayakanagar — 7th 'B' Cross	200
Vinayakanagar — 8th Main	300
Vinayakanagar — 9th Main	300
Vinayakanagar — 9th 'C' Cross	200
Vinayakanagar — 9th 'B' Cross	100
Vinayakanagar — 9th 'A' Cross	100
Total length	8,400

SATURDAY – I & III Week

Locality	*Length (m)*
Vinayakanagar — 7th Cross	800
Vinayakanagar — 7th 'A' Cross	100
Vinayakanagar — 7th 'A' Cross	100
Vinayakanagar — 7th 'B' Cross	150
Vinayakanagar — 7th 'B' Cross	150
Vinayakanagar — 7th 'C' Cross	300
West Padarayanapura — 1st Cross	400
West Padarayanapura — 1st 'A' Cross	400
West Padarayanapura — 1st 'B' Cross	400
West Padarayanapura — 2nd Cross	200
West Padarayanapura — 2nd Cross	200
West Padarayanapura — 3rd Cross	400
West Padarayanapura — 4th Cross	400
West Padarayanapura — 5th Cross	200
West Padarayanapura — 5th Cross	200
West Padarayanapura — 1st Lane	50
West Padarayanapura — 1st Cross ending	50
West Padarayanapura — 6th Cross	200
West Padarayanapura — 6th Cross	200
West Padarayanapura — 7th Cross	200
West Padarayanapura — 7th Cross	200
West Padarayanapura — Nehru Road	300
Manjunathanagar — 5th Cross	300
Manjunathanagar — 5th Cross	25

Locality	*Length (m)*
Manjunathanagar — 5th Cross	25
Manjunathanagar — 2nd Lane	200
Manjunatha nagar — 3rd Lane	200
Manjunathanagar — New 5th Cross Road	75
Samannanagar — 9th Main, 1st Cross, 2nd Cross, 8th Main, 3rd Cross and 7th Main (Kutcha drain)	120
Samannanagar — 6th Main and 5th Main	65
Samannanagar — 3rd Main, 2nd Main and 1st Main	45
New Guddadahalli — H Street	400
New Guddadahalli — H Street	800
New Guddadahalli — G Street	300
New Guddadahalli — G Street	300
New Guddadahalli — F Street	800
Total length	9,255

MONDAY – II & IV Week

Locality	*Length (m)*
New Guddadahalli — Conservancy lane	800
New Guddadahalli — E' Street	800
New Guddadahalli — D' Street	800
New Guddadahalli — C' Street	800
New Guddadahalli — B' Street	400
New Guddadahalli — B' Street	400
New Guddadahalli — Conservancy Lane	1,600
V.S. Garden — 13th Main	300
Padarayanapura — 7th Main	600
Padarayanapura — 11th Main	150
West Padarayanapura —	190
West Padarayanapura —	375
West Padarayanapura — 3rd Cross	1,000
West Padarayanapura — 4th Cross	400
Total length	8,615

TUESDAY – II & IV Week

Locality	*Length (m)*
Padarayanapura — Arrack Shop Road	600
Padarayanapura — near 4th Main Road	100
Padarayanapura — 5th Main	200
Padarayanapura — 5th Main Cross Road	100
Padarayanapura — Conservancy Lane	200
Padarayanapura — Conservancy Lane — 2nd Cross	100
Hindu Burrial Ground Slum	100
Momianpura	150
Momianpura	200
Near Devaraj Urs Colony — 1st Cross	150
Right side of Devaraj Urs Colony — 2nd Cross	400
Right side of Devaraj Urs Colony — 6th Main Road	200
Old Guddadahalli — 1st Cross	400
Padarayanapura — Conservancy lane near 7th Main	400
Padarayanapura — 15th Cross	400
Padarayanapura — 16th Cross	500
Padarayanapura — Conservancy lane	450
Padarayanapura — 11th Main	400
Padarayanapura — 11th Main	500
Padarayanapura — 11th A' Cross	300
Padarayanapura — 11th B' Cross	600
Padarayanapura — between 11th A' Cross and B' Cross	600
Padarayanapura — 11th C' Cross	600
Padarayanapura — 11th D' Cross	700
Padarayanapura — Conservancy lane	600
Total length	8,950

WEDNESDAY – II & IV Week

Locality	*Length (m)*
Padarayanapura — 11th E' Cross	300
Padarayanapura — 11th E' Cross	300
Padarayanapura — 13th Cross	300
Padarayanapura — 13th Cross	300
Padarayanapura — 12th Cross	300
Padarayanapura — 12th Cross	300
Padarayanapura — 15th Cross	500
Padarayanapura — 16th Cross	500
Padarayanapura — 3rd Cross	300
Padarayanapura — Conservancy lane — 5th Main	300
Padarayanapura — Conservancy lane — 5th Main	100

Locality	*Length (m)*
Padarayanapura — Conservancy lane — 13th Cross	500
Padarayanapura — Conservancy lane — 13th Cross	500
Padarayanapura — Conservancy lane — 13th A' Cross	600
Padarayanapura — Conservancy lane — 13th B' Cross	400
Padarayanapura — Conservancy lane —	200
Padarayanapura — Conservancy lane — 13th C' Cross	400
Padarayanapura — Conservancy lane —	600
Padarayanapura — Conservancy lane — 13th D' Cross	300
Padarayanapura — Conservancy lane — 13th E' Cross	400
Padarayanapura — Conservancy lane — 13th F' Cross	400
Padarayanapura — 9th Main	35
Padarayanapura — 9th Main 1st lane	200
Padarayanapura — 9th Main 2nd lane	200
Padarayanapura — 8th Main	500
Total length	8,735

THURSDAY – II & IV Week

Locality	*Length (m)*
Padarayanapura — 8th Main 1st lane	200
Padarayanapura — 7th Main	1,200
Padarayanapura — Hosekera village Road	800
Padarayanapura — from Agro Co. Ltd.	50
Deepanjali nagar — 1st Main Road	800
Byatrayanapura — 3rd Main	600
Byatrayanapura — 4th Main	200
Byatrayanapura — A Cross	400
Byatrayanapura — D' Cross	100
Byatrayanapura — Avallahalli A' Main Road	300
Deebanjali nagar — Service Road	400
Timberyard layout — 2nd Main	1,000
Timberyard layout — HGT Quarters 1st Street	70
Timberyard layout — 1st Cross	200
Timberyard layout — 1st Cross	200
Timberyard layout — 2nd Cross	200
Timberyard layout — 2nd Cross	200
Timberyard layout — 3rd Cross	200
Timberyard layout — 3rd Cross	200
Byatrayanapura — 4th Cross	800
Byatrayanapura — 2nd Main	400
Total length	8,520

FRIDAY – II & IV Week

Locality	*Length (m)*
Byatrayanapura — 2nd Main	400
Byatrayanapura — 5th Main	400
Byatrayanapura — 5th Main	400
Kasturibai nagar — Pipeline Road	200
Kempapura Agrahara — 12th Cross	800
Kempapura Agrahara — 13th Cross	600
Kempapura Agrahara — 13th A' Cross	300
Kempapura Agrahara — 13th B' Cross	150
Kempapura Agrahara — 13th C' Cross	300
Kempapura Agrahara — 13th D' Cross	150
Mariyappanapalya — 24th Cross	1,000
Mariyappanapalya — 25th Cross	400
Mariyappanapalya — 26th Cross	400
Mariyappanapalya — 23rd Cross	800
Mariyappanapalya — 1st Main	300
Mariyappanaplaya — 1st A' Main	600
Mariyappanapalya — 1st Main 1st Cross	400
Mariyappanapalya — 1st Main 2nd Cross	400
Mariyappanapalya — 1st Main 3rd Cross	400
Total length	8,400

SATURDAY – II & IV Week

Locality	*Length (m)*
Mariyappanapalya — 1st B' Main	600
Mariyappanapalya — 2nd Main	600
Mariyappanapalya — 3rd Main	600
Mariyappanaplaya — 4th Main	600
Mariyappanapalya — 5th Main	800
Mariyappanapalya — 5th Main 1st Cross and 2nd Cross	70
Mariyappanapalya — 5th Main 3rd Cross	30
Mariyappanapalya — 23rd Cross	800
Mariyappanapalya — 15th Main	200
Magadi Road — A' Street	400
Magadi Road — 6th Cross	400
Magadi Road — 8th Cross B' Block	300
Magadi Road — 8th Cross A' Block	250
Magadi Road — 7th Cross	500
Magadi Road — 5th Main	400
Magadi Road — Conservancy Lane	200
Magadi Road — 3rd Main Road	200
Magadi Road — 1st Main	200
Magadi Road — 17th Cross	150
Magadi Road — 9th Cross	400
Total length	7,700

TABLE 28

Drains requiring engineering solutions

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)	Solution
33	Vinayakanagar 6th Cross	Ce/U/UC	400	.5	200	Regrading
”	” 7th Cross	”	800	.5	400	Replacement of slabs
35	West Padrayanapura slums area	Ce/U/UC	100	.5	50	Sealing
”	Main Road Padarayanapura (via) 14th corss joins to Main canal	”	500	1	500	Replacement of slabs
”	Padarayanapura 6th Main	Ce/U/UC	800	.5	400	Replacement of slabs
”	” 4th Cross	”	200	1	200	Sealing
”	” 9th Main	”	500	1	500	Replacement of slabs
”	” 8th Main	Ce/U/UC	500	.5	250	Regrading
”	” 7th Main	Ce/U/UC	400	.5	200	Replacement of slabs
”	” 7th Main	Ce/U/UC	400	.5	200	Regrading
33	Devaraj Urs Nagar 3rd Main	Ce/U/UC	100	1	100	Replacement of slabs
36	Hosakere Village Road	Ce/U/UC	800	1	800	Repairing of bed slabs
34	Jagajivanram Nagar 3rd Main Road	Ce/U/UC	80	1	80	Replacement of slabs
35	Padarayanapura 7th Main Road	Ce/U/UC	600	.5	300	Regrading
”	” 14th Cross	Ce/U/UC	300	.5	150	Replacement of slabs
”	” 6th Main Road	Ce/U/C	800	1	800	— do —
”	J.R. Nagar Main Road	”	500	1	500	Sealing properly
”	” II Main Road	”	600	1	600	— do —
”	” 6th Cross	”	100	1	100	Replacement of slabs
”	” Main Road to 3rd Cross	”	100	1	100	— do —
”	Muslim burial ground left side Mysore Road	”	950	1	950	Sealing properly
”	Murenahally House No.44, Lane	”	100	.7	70	Replacement of slabs
31	Mariyappanapalaya 27th Cross	Ce/U/UC	400	.5	200	Regrading
”	— do — 28th Cross	”	400	.5	200	”
”	— do — 23rd Cross	”	800	.5	400	”
”	— do — 6th Cross	”	400	.5	200	”

TABLE 29

Drains requiring one time desilting and deweeding

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)
29	Govindraj Nagar 22nd Cross (Main Road)	Ce/U/UC	1000	.5	500
"	" 7th Cross Road	"	600	.5	300
"	" III Main Road	"	2000	.5	1000
"	" II Main Road	"	1500	.5	750
"	" IV A. Main Road (Nagarabavi Main Road to 4th Cross Road, Govindarajnagar)	"	2000	.5	1000
"	M.C. Layout, 9th Cross	"	500	.5	250
"	" 11th Cross	"	300	.5	150
"	" "	"	300	.5	150
"	" 12th Cross	"	150	.5	75
"	" "	"	300	.5	150
"	14th A.Main Road M.C. Layout	"	200	.5	100
"	13th Cross Road, M.C. Layout	"	500	.5	250
"	6th Cross, M.C. Layout	"	600	.5	300
"	14th Cross Road Layout	"	500	.5	250
"	Ist A. Cross Road, M.C. Layout	"	500	.5	250
"	Byatarayanapura Mysore Road to M.G.T quarters centre	KD	200	1	200
"	Byatarayanapura Conservancy Lane	Ce/U/UC	600	.3	180
34	V.S. Garden II Main	Ce/U/UC	100	.5	50
"	Padarayanapura 3rd Main Road	"	200	1	200
"	" 8th Main Road	"	800	.5	400
"	" 9th Main Road	L	400	.5	200
"	" Conservancy	L	400	.5	200
"	" 8th Main	L	400	.5	200
29	Binny Layout II Stage 2nd Main	Ce/U/UC	400	.5	200
"	" "	Ce/U/UC	400	.5	200
"	" I Cross	"	200	.5	100
"	" "	L	200	.3	60
"	" II Cross	Ce/U/UC	200	.5	100
"	" "	L	200	.3	60
"	" III Cross	Ce/U/UC	400	.5	200
"	" IV Cross	Ce/U/UC	200	.5	100
"	" "	L	200	.3	60
"	" I Main	Ce/U/UC	800	.5	400
"	K.H.B. Colony 24th Cross	"	200	.5	100
"	Binnypet 8th Cross	"	300	.5	150
"	Govindarajanagar 17th Cross	"	400	.5	200
"	M.C. Layout 16th Cross	"	400	.5	200
"	" 13th Cross	"	400	.5	200
"	4th Cross Road Devaraj Urs	L	500	.5	250
"	Colony to Mysore Road	Ce/U/UC	100	.5	50

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)
”	4th Cross Road to 3rd Cross Road Mysore Main Road	Ce/U/UC	150	.5	75
”	3rd Cross Road	L	400	.5	200
”	Vinayakanagar Pipe Line	Ce/U/UC	600	.5	300
”	2nd Cross Vinayakanagar Conservancy Lane	”	800	.3	240
”	” Ist Cross	L	800	.3	240
”	” Ist ‘A’ Cross	L	50	.3	15
		Ce/U/UC	50	.5	25
”	” 7th Cross	L	400	.3	120
”	Pipe line road from Mysore Road	Ce/U/UC	400	.5	200
”	Vijayanagar II Stage 4th Main	Ce/U/UC	1000	.5	500
”	” 3rd ‘B’ Main	”	1000	.5	500
”	” 3rd ‘A’ Main	”	1000	.5	500
”	” 3rd Main	”	1000	.5	500
”	” Ist ‘C’ Main	”	1000	.5	500
”	” 3rd Cross	”	1000	.5	500
”	” 4th Cross	”	1000	.5	500
30	Vijayanagar II Stage 3rd Cross	Ce/U/UC	1000	.5	500
”	” 4th Cross	”	1000	.5	500
”	” 5th Cross	”	600	.5	300
”	” 6th Cross	”	600	.5	300
”	Buvaneswari slums I Cross & II Cross	Ce/U/UC	100	.5	50
”	” I & II Cross	L	100	.5	50
”	” III Cross	Ce/U/UC	50	.5	25
”	” 7th Cross	”	800	.5	400
”	” 7th ‘A’ Cross	”	600	.5	300
”	” 8th Cross	”	1000	.5	500
”	” 9th Cross	”	800	.5	400
”	” 10th Cross	”	600	.5	300
”	” Ist ‘A’ Cross	”	800	.5	400
”	” Ist ‘B’ Cross	”	800	.5	400
”	” Ist ‘C’ Cross	”	400	.5	200
”	” Ist ‘D’ Cross	”	600	.5	300
”	” 11th Cross	”	1000	.5	500
”	” 12th ‘A’ Cross	”	600	.5	300
”	” 12th Cross	”	1000	.5	500
”	RPC Layout 6th Cross	”	200	.5	100
32	Mariyappanpalaya 2nd Cross	Ce/U/UC	100	.5	50
”	” 5th Cross Magada Road	”	100	1	100
”	” ‘A’ Cross ”	Ce/U/UC	200	.5	100
”	” ‘B’ Cross ”	”	200	.5	100
”	” ‘C’ Cross ”	Ce/U/UC	200	.5	100
”	” ‘D’ Cross	”	200	.5	100
”	” ‘E’ Cross	”	200	.5	100
”	” ‘F’ Cross	”	200	.5	100
”	” ‘G’ Cross	”	200	.5	100
”	” ‘H’ Cross	”	200	.5	100

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)
"	Naganima Slum Road	"	150	.5	75
"	" 2nd Cross	"	200	.5	100
		L	200	.4	80
"	" 10th Main	"	300	.4	120
"	" 'A' Cross	L	300	.4	120
"	" 9th Main	Ce/U/UC	600	.5	300
"	" 9th 'B' Main	"	600	.5	300
"	" 9th 'C' Main	"	600	.5	300
"	" 9th 'D' Main	"	600	.5	300
		Ce/U/UC	200	.75	150
"	" 3rd Cross	Ce/U/UC	200	.5	100
"	" 4th Cross	"	400	.5	200
35	Padarayanapura 3rd Cross	Ce/U/UC	500	.5	250
"	" 3rd Cross	Ce/U/UC	700	.5	350
"	Jagajivanram Nagar Road	"	100	.5	50
33	Hosa Guddadahally 'B' Street Conservancy Lane	Ce/U/UC	400	.5	200
"	Mysore Road	Ce/U/UC	500	1	500
"	10th Main	"	200	.5	100
"	Padarayanapura 3rd Cross Left	"	300	.5	150
"	" 3rd Cross Right	"	300	.5	150
"	" 13th 'B' Cross Conservancy Lane	"	200	1	200
"	" 9th Main	"	500	.5	250
"	" Near Railway Line	"	800	1	800
"	Hosahally Main Cross Road	"	100	1	100
	Hosahally Main to Padarayanapura Cross	"	400	1	400
"	" 14th Cross	"	600	.5	300
"	Main Road, 4th Cross to slums area Padarayanapura (Right side).	"	400	.75	300
"	7th Main Road	"	2000	.5	1000
"	2nd Cross (Near main Road)	"	200	.5	100
"	Ist Cross (HBG Slums) West side–Mysore Rd.)	"	50	1	50
37	Valmikinagar Near 11th Cross	Ce/U/UC	160	.5	80
"	" Conservancy	LD	160	.5	80
"	Markandaiah Layout 2nd Main	Ce/U/UC	200	.5	100
"	Azadnagar, 2nd Main Conservancy	L	300	.5	180
"	" 2nd cross Conservancy	Ce/U/UC	400	.25	100
"	" 3rd cross	"	400	.25	100
"	" 5th cross Conservancy	Ce/U/UC	700	.5	350
"	" 6th cross	L	400	.5	200
"	" "	Ce/U/UC	400	1	400
"	" Conservancy	"	500	.5	250
"	" 7th Cross Conservancy	LD	80	.5	40
31	Mariyappanpalaya I Main	Ce/U/UC	300	.5	150
"	" D Street	"	200	.5	100
"	" 15th Cross	"	75	.5	37.5
"	" 7th Main 12th cross to 9th cross	"	800	.5	400
"	Mariyappanpalya Cross	"	600	.25	150
"	" 12th cross to 9th cross	"	800	.5	400

TABLE 30

List of cesspits requiring filling.

Div.No.	Locality	Length	Width	Area (m^2)
30	Hosahally I slums opp. Maryunatha Dry cleans	2	1	2
”	Marenahally side of 13/2 Mallapa	2	2	4
”	M.C. Layout 22nd Cross	2	2	4
33	Maryunatha Nagar 5th Cross	4	3	12
”	” 5th Cross No.67	2	2	4
”	No.68, backside 5th cross	3	2	6
”	” 6th cross	3	2	6
”	II Lane Road	2	2	4
”	” 5th Cross Road	2	1	2
”	Samannanagar II Cross	.5	.5	.25
	” ”	1	.5	.5
”	” 8th Main	1	.5	.5
”	” III Cross	.5	.5	.25
	” ”	.5	.5	.25
”	” IV Cross	.5	.5	.25
	” ”	.5	.5	.25
”	” IV Cross	.5	.5	.25
”	” VI Main	.5	.5	.25
”	” IV Cross	.5	.5	.25
	” ”	1	.5	.5
”	” V Main	.5	.5	.25
	” ”	1	.5	.5
	” ”	.5	.5	.25
”	” IV Main	.5	.5	.25
	” ”	1	.5	.5
	” ”	.5	.5	.25
	” ”	.5	.5	.25
”	” 3rd Main	.5	.5	.25
		.5	.5	.25
		1	.5	.5
”	” 2nd Main	1	.5	.5
	” ”	.5	.5	.25
	” ”	.5	.5	.25
”	” 1st Main	.5	.5	.25
	” ”	.5	.5	.25
	” ”	.5	.5	.25
”	Padarayanapura	1	1	1
”	”	.5	.5	.25
	”	.5	.5	.25
”	”	1	.5	.5
”	”	1	.5	.5
”	”	1	1	1
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	2	.3	.6

Div.No.	Locality	Length	Width	Area (m^2)
,,	,,	.5	.5	.25
,,	,,	1	.5	.5
,,	,,	1	.5	.5
,,	Vinayaka Nagar Near pipe line	1	.5	.5
,,	,,	.5	.5	.25
36	Timber yard. M.G.T. Quarters	1	1	1
,,	Timber yard garden	1	1	1

TABLE 31

List of cess pools requiring filling or release of fish.

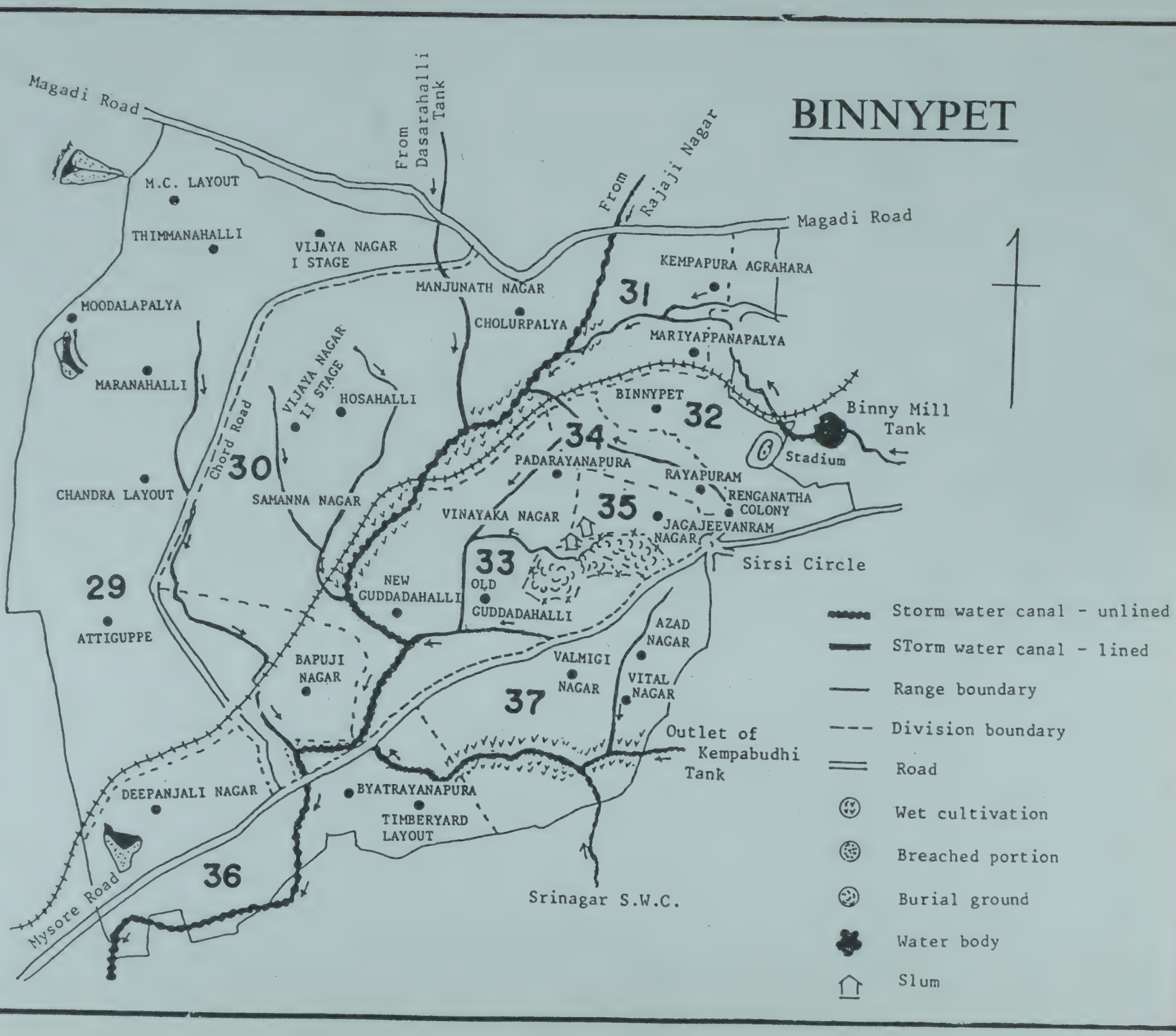
Div. No.	Locality	Length	Width	Area (m^2)
36	Cholurpalaya VI Cross	50	25	1250
,,	,, IX Cross	10	8	80
,,	,, 3rd Cross No.39/2	8	3	24
,,	,, 4th Cross Right side	10	8	80
,,	,, 4th Cross Left side	8	3	24
,,	,, 5th Cross Right side	8	8	64
,,	,, 5th Cross Left side	50	20	1000
,,	,, 6th Cross Right side	10	7	70
,,	,, Left side	15	10	150
,,	,, In front of Maryunath refreshment	10	8	80
,,	,, 7th Lane left side	8	6	48
,,	,, 7th Lane Right side	9	6	54
,,	,, 8th Lane	8	8	64
37	Kasturibai Nagar	20	5	100
,,	West Padarayanapura	10	10	100
,,	,,	10	10	100
,,	New Guddadahally	5	5	25
	Near pipe line	5	3	15
29	Near New English School	5	5	25
,,	Central Excise Layout	2	1	2
,,	Income tax layout	10	10	100
,,	Maruthi Talkies Attikuppe left side	10	6	60
30	Maryunathanagar IV, V Cross	10	2	20
,,	Vrishibhavathy valley sides Cholurpalaya V Cross	20	10	200

TABLE 32

List of quarry pits requiring filling

Locality	Length	Width	Area (m^2)
Byatarayanapura	10	15	150
Kasturibai Nagar	60	40	2400

BINNYPET


Magadi Road
From Dasarahalli Tank
From Rajaji Nagar
Magadi Road
M.C. LAYOUT
THIMMANAHALLI
VIJAYA NAGAR I STAGE
MANJUNATH NAGAR
KEMPAPURA AGRAHARA
31
CHOLURPALYA
MARIYAPPANAPALYA
MOODALAPALYA
MARANAHALLI
VIJAYA NAGAR II STAGE
HOSAHALLI
BINNYPET
32
Binny Mill Tank
Chord Road
30
34
Stadium
PADARAYANAPURA
RAYAPURAM
RENGANATHA COLONY
CHANDRA LAYOUT
SAMANNA NAGAR
VINAYAKA NAGAR
35
JAGAJEEVANRAM NAGAR
33
Sirsi Circle
29
NEW GUDDADAHALLI
OLD GUDDADAHALLI
ATTIGUPPE
BAPUJI NAGAR
VALMIGI NAGAR
AZAD NAGAR
VITAL NAGAR
37
Outlet of Kempabudhi Tank
DEEPANJALI NAGAR
BYATRAYANAPURA
TIMBERYARD LAYOUT
36
Mysore Road
Srinagar S.W.C.
Storm water canal - unlined
STorm water canal - lined
Range boundary
Division boundary
Road
Wet cultivation
Breached portion
Burial ground
Water body
Slum

3.6. CHAMARAJPET RANGE

Chamarajpet Range is situated in the south-western part of the Bangalore City and covers approximately 4 sq.km. area and has a population of about 1,69,551. This range is divided into seven divisions. The various localities under each of these divisions are presented in the Table 33.

Breeding Habitats:

Various habitats under this range were surveyed and measured. These are given in Table 34.

Some of these breeding habitats are of special significance from the mosquito breeding point of view and therefore these are elaborated further.

Drains:

Various drains in the range were surveyed and measured (180 km.). Most of the drains in Sudama Nagar, Vinobha Nagar slums, Kalasipalyam, SGN layout, Mothi Nagar, Mumtaz Complex, K.S. Garden, Avenue Road (Sultan Sahib lane), Mysore Road are blocked with garbage and silt. In some places the box drains are severely damaged and slabs removed creating grounds for mosquito breeding in the drains. The details of the various drains in the range are given in Table 35.

TABLE 33

Divisions and Localities in Chamarajpet range.

Division No.	Name of the locality
38	Cubbonpet, Bandappa lane, Siddhanna lane, Lingasettypet and Opp. Chamarajpet.
39	Avenue Road, OTC Road and Kumarapet Road.
40	Raghavendra Colony, Devanachari Road and Mysore Road.
41	Anandapur slum (1st to 8th lane), Sultan Road, Thippu Nagar and Chamarajpet Main.
42	New Tharagupet, Sithapatti, Agrahara Cross, Mysore Road to Chamarajpet Circle, Sultana Road to Avenue Road and Shardha Samaj Road.
43	Lalbaugh Road, Kalasipalyam New Extension, Mothi Nagar, J.C.Road to Lalbaugh Road, Nursery Garden Road, SBM layout, Siddhaya Road, N.K. Arumugam Road, Journalist Colony, Sri Dhurgammal Temple Road, Narasimharaja Road, and New Bamboo Bazaar.
44	Usman Khan Road, Doddamarahalli, H.Siddaiya Road, Alwin Quarters, Sudama Nagar, Ammachiamma Garden, Vinobha slums and K.S. Garden slums.

TABLE 34

Measurements of various breeding habits.

Type of breeding habitat	Length (m)/No.	Surface area (sq.mts.)
Storm Water Canal	2,000	2,000
Drains	1,87,245	93,623
Cess pits	20	50
Cess pools	5	500
Wells	202	240
Overhead tanks	544	1,088

TABLE 35 Drains in Chamarajpet Range

Div. No.	Pukka Drain			Kutcha drain	Total length (in mts.)
	Covered	Uncovered	'L'drain		
38	15,650	Nil	2,450	Nil	18,000
39	14,250	Nil	1,400	Nil	15,650
40	10,200	1,600	39,000	270	51,070
41	13,900	1,200	11,900	Nil	27,000
42	6,000	150	5,120	Nil	11,270
43	21,700	5,700	2,775	Nil	30,175
44	11,200	13,800	8,900	80	33,980
Total	92,900	22,450	71,545	350	1,87,245

In Tables 36 and 37, lists of drains requiring engineering work and yearly cleaning are presented.

Control:

a. *Storm Water Canals*:

a.1. *Akkipet Main Storm Water Canal (1.5 km)*:

This storm water canal enters the range from Kalasipalyam and continues upto Double Road for a length of about 1.5 km.

Solutions:

1. The canal should be cleaned and desilted regularly.
2. Near the Double Road some slabs are removed near the cunnette, which leads to spreading and stagnation of water. The Engineering Department (BCC) must replace them to streamline the cunnette.

a.2. *Basavangudi Storm Water Canal (1 km)*:

This storm water canal originates from Visweswarapura (Basavangudi range) and after passing through Journalist Colony (Kalasipalyam), Tank bund Road and finally joins the Akkipet Main storm water canal near SJP Road.

Solution:

1. The canal needs regular cleaning and desilting.

b. *Drains*:

b.1. *Sudama Nagar Drain (0.5 km)*:

This drain originates from the Mission Road area and passes through 1st Cross, RPM Extension and 2nd Cross, S. V. Colony and finally joins the Main Strom Water canal in the south near Nals Cross.

Problems:

1. The drain is found full of garbage dumped by the people in various areas.
2. Silt is enormously accumulated and consequently water is logged up in the drain at various points.
3. Latrines from old and newly constructed unauthorised houses have been directly connected to the main drain, which pollute the drain water and make the habitat suitable for breeding of mosquitoes. Similarly sullage from such houses is also directly pouring into the drain and adding more pollution.

Solutions:

1. The garbage and silt should be regularly removed from drain.
2. BWSSB should provide underground sewerage system for such houses to avoid sewage and sullage falling into the drain.

b.2. *Annapoornima Road Drain (0.1 km)*:

This drain originates from the 7th Cross Sudama Nagar and joins the main storm water canal near Double Road after passing through 8th and 9th cross of Sudama Nagar and Vinobha Nagar slum. This is entirely a box drain.

Problems:

1. Residents in Vinobha Nagar slums do not have underground latrine connections and therefore sewage is directly let into the drain.
2. At some places roof slabs are missing and garbage is dumped through these gaps into the drain by the people in many localities, blocking the water flow.
3. Silt is also found deposited at some streches of the drain.

Solutions:

1. BCC and BWSSB should jointly look after the major slum problem. Meanwhile, the BWSSB should provide underground latrine connections to such houses.
2. The garbage and silt must be immediately removed and the cover slabs replaced to prevent future dumping of garbage in such places.
3. Since this drain passes through the slum area, it is desirable to regularly spray in several smaller kutcha drains of the locality before these produce mosquitoes and make the drain also mosquitogenic.

c. *Cess pits and Cess pools*:

There are only 20 cess pits present mostly in the northern side of Kempabhudhi Tank and Kalasipalyam slum area. They must be closed and the sullage of such houses must be given underground connection to the main sewerage system. Until then, regular weekly spray with fenthion should be carried out at the recommended dose of 1 ppm. Only four cess pools measuring in all 500 Sq.m. are found in Dhobighot area. These cess pools become major breeding areas when polluted. Attempt should be immediately made to fill up these pools with garbage and silt removed from the drains in other places. Till such a time, fenthion should be sprayed in the cess pools to control mosquitoes.

d. *Overhead tanks and wells*:

There are 544 overhead tanks and 207 wells in this range. They however do not form a major breeding habitat. The overhead tanks should be covered with lids. The unused wells could be protected from mosquito breeding with the application of Expanded Polystyrene beads at 500 g/m^2. In the used wells, fish should be released.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	—	—	2
2.	Cleaning/Deweeding	1	—	4
3.	Monitoring	—	3	—

WEEKLY SPRAY SCHEDULE FOR CHAMARAJPET RANGE

MONDAY

Cubbonpet, Bandappa lane, Siddanna lane and Lingasettypet.

TUESDAY

New Tharagupet, Mysore Road to Chamarajpet Circle, Sultanpet, Agrahara Cross, Sultan Road to Avenue Road and Saradha Samaj Road.

WEDNESDAY

Devanachari Road, Mysore Road, Tippu Nagar, Sultan Road, Chamarajpet Main and Raghavendra Colony.

THURSDAY

Kalasipalyam New Extension, Mothi Nagar, J.C. Road to Lal Baugh Road, Journalist Colony, New Bamboo Bazzar, Sri Durgamma Road, N.R.Road and Usman Khan Road.

FRIDAY

Dodda marahalli, Siddaiah Road, Alwin Quarters, Sudama Nagar, Ammachiamma Garden, Vinobha Nagar slum and K.S.Garden slum.

SATURDAY

Avenue Road, OTC Road, Kumbarapet Road, SJP Road, Nagarthapet and Anandapuram slum.

SCHEDULE FOR REGULAR CLEANING AND DEWEEDING OF DRAINS IN CHAMARAJPET RANGE

MONDAY – I & III Week

Area	*Length (m)*
Kempabhuthi Tank bund — 1st Cross	100
Kempabhuthi Tank bund — 2nd Cross	100
Kempabhuthi Tank bund — 3rd Cross	70
Mysore Road — Anandapuram Slum — 1st lane	300
Mysore Road — Anandapuram Slum — 2nd lane	400
Mysore Road — Anandapuram Slum — 3rd lane	400
Total length	1,370

TUESDAY – I & III Week

Area	*Length (m)*
Anandapuram Slum — 4th lane	300
Anandapuram Slum — 5th lane	300
" — 6th lane	300
" — 7th lane	400
Total length	1,300

WEDNESDAY – I & III Week

Area	*Length (m)*
Anandapuram slum — 8th lane	400
Tippunagar slum — 1st lane	600
Total length	1,000

THURSDAY – I & III Week

Area	*Length (m)*
Thippunagar slum 2nd lane	600
Thippunagar slum 3rd lane	600
Thippunagar slum 7th lane	200
Total length	1,400

FRIDAY – I & III Week

Area		*Length (m)*
Thippu nagar slum — 4th lane		600
" — 5th lane		500
— 1st Main		300
	Total length	1,400

SATURDAY – I & III Week

Area		*Length (m)*
Thippunagar slum — 6th lane		400
Vinobhanagar slum — 1st Main		200
Kalasipalyam New Extension — Mission Road		50
Kalasipalyam — SFN layout		500
	Total length	1,150

MONDAY – II & IV Week

Area		*Length (m)*
Vinobha nagar slum		1,000
Kalasipalyam Fire works Colony		150
	Total length	1,150

TUESDAY – II & IV Week

Area		*Length (m)*
Kalasipalyam New extention		150
Kalasipalyam 2nd Main		200
Double Road, 1st Main		500
Mothi nagar 2nd Cross		200
	Total length	1,050

1650

WEDNESDAY – II & IV Week

Area	*Length (m)*
Kalasipalyam, Narayana layout	100
Mothi nagar, Gangamma Colony Road — 2nd Cross	200
Mothi Nagar, Mumtaz Complex	200
Sudamanagar — 1st lane	200
Sudamanagar — 1st Main, 3rd Cross	400
Total length	1,100

THURSDAY – II & IV Week

Area	*Length (m)*
Sudamanagar 1st Main	1,000
Ammachiamma Garden	70
Total length	1,070

FRIDAY – II & IV Week

Area	*Length (m)*
K.S Garden 3rd Main to 6th Main	300
Lalbaugh Road 1st Main	600
Total length	900

SATURDAY – II & IV Week

Area	*Length (m)*
Sudamanagar — Ramasamy lane	600
Sudamanagar — K.S. Garden	400
Total length	1,000

INSECTICIDE REQUIRED/ANNUM

Fenthion (82.5% EC)	...	...	25 lit
M.L. Oil	...	...	100 lit

Others:

Expanded Polystyrene beads	...	...	25 Kg.

Equipments:

Scrappers	...	...	10 Nos.
Spades	...	...	5 Nos.
Bonds	...	...	10 Nos.

TABLE 36

List of drains in Chamarajpet Range requiring engineering solution

Div. No.	Locality	Shape & type of drain	Length	Width	Surface area (m^2)	Solution
38.	Cottonpet Main to Bassappa Park Road	Ce/U/C	500	1.00	500	Proper sealing
38.	Cottonpet 1st Main to 6th Cross	Ce/U/C	1,000	1.00	1,000	"
38.	Cottonpet, Hanumappa lane	Ce/U/C	300	1.00	300	"
38.	Cottonpet, P.R.Sastri lane	Ce/U/C	100	1.00	100	"
38.	Cottonpet, O.T.C. Road	Ce/U/C	200	1.00	200	"
39.	Avenue Road, Sultan Sahib lane	Ce/U/C	300	1.00	300	Replacement of slabs
40.	Mysore Circle, 5th Main 7th Cross to 9th Cross	Ce/U/C	200	1.00	200	Proper sealing
41.	Tippu Nagar slum 1st Cross	Ce/U/C	300	1.00	300	rep. slabs
43.	Vinobha Nagar slum 6th Cross	Ce/U/C	75	0.50	38	Proper sealing
43.	Kalasipalyam Padmasala Hostel	Ce/U/C	200	1.00	200	"
43.	" Narayana layout	Ce/U/C	100	0.50	50	Regrading
43.	" 2nd Main	Ce/U/C	200	0.70	140	Proper sealing
43.	" 1st Main (Jothi Photo)	Ce/U/C	200	1.00	200	"
43.	Mothi Nagar 2nd Cross R.R.Road	Ce/U/C	200	1.00	200	"
43.	Mothi Nagar, Mumtaz Complex	Ce/U/UC	200	0.70	140	Regrading
44.	Sudama Nagar — 1st Main	Ce/U/UC	30	0.50	15	Regrading
44.	Mission Road, Near Subbaiah Circle	Ce/U/UC	10	1.00	10	Replacement of slabs
44.	K.S. Garden — 4th Cross	Ce/U/UC	200	0.50	100	Proper sealing

TABLE 37

Drains requiring one time cleaning and deweeding

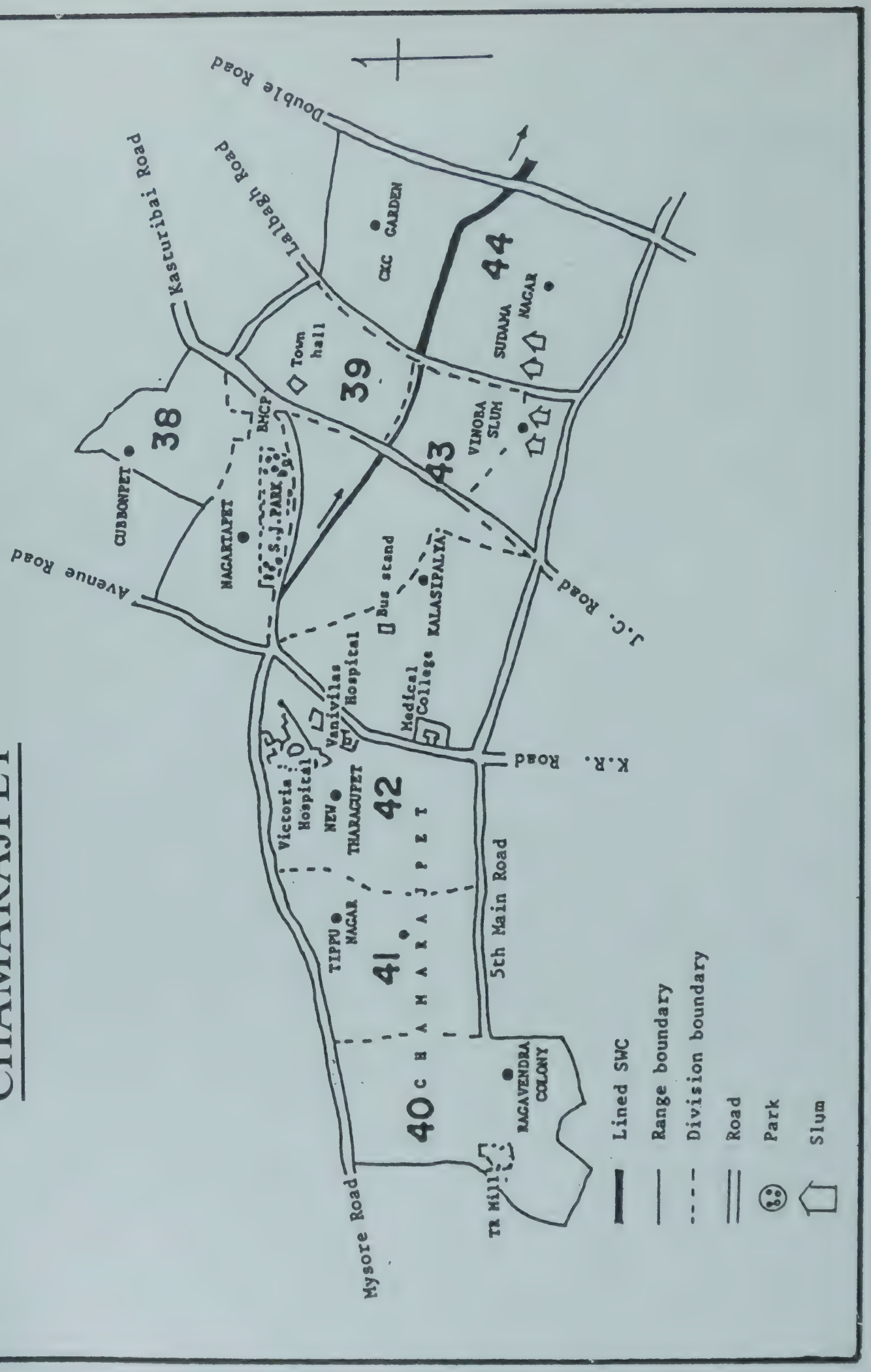
Div. No.	Locality	Type of drain	Length	Width	Area (m^2)
39	Avenue Road	Ce/U/C	800	1	800
"	" Cross	Ce/U/C	200	1	200
"	Gandhian street	Ce/U/C	250	1	250
"	Saubhudha lane	Ce/U/C	300	1	300
"	Hakhim Khaleel Khan Street	Ce/U/C	400	1	400
"	Denbi Nawab Street	Ce/U/C	100	1	100
"	Venkata Ramanna lane	Ce/U/C	200	1	200
"	Cottonpet Kenchuyaikhan lane	Ce/U/C	200	1	200
"	Avenue Road Mandivenkatappa lane	Ce/U/C	300	1	300
"	JP lane	Ce/U/C	100	1	100
"	PP lane	Ce/U/C	100	1	100
"	PP lane 3rd, 2nd I Cross	Ce/U/C	300	1	300
"	Ramanna Lane	Ce/U/C	600	1	600
"	Muniswamappa lane	Ce/U/C	400	1	400
"	Gollara Ganganna lane	Ce/U/C	500	1	500
"	Ramaswamy Chetty Road	Ce/U/C	300	1	300
"	OTC Road	Ce/U/C	400	1	400
40	Nanjamba Agrahara Conservancy lane	L	700	.5	350
"	" 3rd Main	L	400	.5	200
"	II Main 6th Cross to 9th Cross	Ce/U/C	2000	1	2000
"	Devanathachari Road Raghavendra colony	Ce/U/C	1000	1	1000
"	Conservancy lane 1st Cross	L	1200	.5	600
"	" II Cross	U	400	.5	200
"	Nanjamba Agrahara Conservancy lane 1st Main Road	L	900	.5	450
"	" 1st Main Road	Ce/U/C	200	.5	100
"	" 1st Cross Road	Ce/U/UC	400	.5	200
"	" II Main Road	L	300	.5	150
"	" "	L	400	.5	200
"	" "	L	400	.5	200
43	Kalasipalayam New Extension—III Cross	Ce/U/C	800	.5	400
"	" —IV Cross	Ce/U/UC	600	.5	300
"	" —I Main	Ce/U/UC	1150	1	1150
"	" —V Cross	Ce/U/C	500	1	500
"	N.K.Arumugam Road	Ce/U/C	800	1	800
"	" IInd Cross, Journalist Colony	Ce/U/C	300	.5	150
44	Doddamarahally Susila Road—1st Cross	Ce/U/C	300	.5	150
"	" —II Cross	Ce/U/C	600	.5	300
"	" —III Cross	L	600	.5	300
"	" —IV Cross	Ce/U/C	600	.5	300
"	" —V Cross	L	600	.5	300
"	" —VI Cross	Ce/U/C	600	.5	300
"	J.C.Road	Ce/U/C	600	1	600
"	Conservancy	L	500	0.5	250

Div. No.	Locality	Type of drains	Length	Width	Area (m^2)
"	Kubar sine lane	Ce/U/UC	400	.5	200
"	7th Cross	Ce/U/C	600	1	600
"	Conservancy	L	600	.5	300
"	H. Siddaiah Road	Ce/U/C	1500	1	1500
"	Rudrappa compound	L	150	.5	75
"	Lalbaugh Main Road	Ce/U/C	400	1	400
"	Lalbaugh Fort Road	Ce/U/C	1500	1	1500

A phrase by Andre Gide has never seemed so striking as when applied to the objective of health for all and the path of primary health care which leads to it. "We enter the beneficial world of reality through the narrow gate of Utopia". Surely it is not fanciful to describe as Utopia the presentation of a new model intended to do away with the inadequacies of present health services. If we begin by declaring that the changes envisaged are impossible to achieve, it becomes a fine excuse for not making the necessary creative effort.

COMLAN A.A. QUENUM

CHAMARAJPET



3.7. BASAVANGUDI RANGE

Basavangudi range is situated at the southern side of the city and covers an area of about 11 Sq. km. Its total population is about 1,98,000. For convenience of carrying out anti-mosquito control and sanitation, the whole range is divided into 8 divisions. The major localities in each of the divisions are mentioned in Table 38.

Breeding habitats:

Total breeding area present in this range are summarized in Table 39.

Drains:

Various kinds of drains were surveyed and measured in the range and their types were determined. These are summarized in Table 40.

TABLE 38

Divisions and Localities in Basvangudi range.

Division No.	Name of Localities
45.	Nanjappa block, Appa Rao Road, Samayapura, Kempegowda Road, Mahanath layout and MGK Moorthy layout.
46.	Shankarmutt Road, V.V.Road, Vardammaniah Block, Chickanna Garden, Lalbaugh Fort Road, North Anjaneya Temple Road, Bull Temple Road, Guttahalli Main and Sankara Park.
47.	V. V. Puram, National High School Road, Govindappa Road, Krishna Road and Market Street.
48.	Banasankari I stage, II Block, 80 feet Road, Srinagar I Block, Srinagar Bus Stand, Bank Colony and Vidya Gopala Circle.
49.	Hanumanthanagar, Anjaneya Temple Road, Gavipuram Extension, BMS College area, Bassappa layout and Ashoknagar.
50.	Thiagaraya nagar, 40 feet Road, 80 feet Road, Narasimaraja Colony, Bovi Colony, East Anjaneya Road and Mallikarjuna Temple Road.
51.	Ashok pillar, Jayanagar 2nd Block, Mariappa Road, Vijaya College slum, R.V. Road, Govindappa Road, Basavangudi, Pottalammagudi Road, Old Kanagapura Road and Lalbaugh West Road.
52.	Banasankari II Stage, Yarub nagar slum, Kaveri nagar slum, Bhavani slum and Karisandra.

TABLE 39

Measurements of various breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface area (m^2)
Tank	1	1,48,400
Storm water canal	8,500	8,500
Drains	4,11,455	2,05,728
Cesspools/Vacant plots	21	8,635
Cess pits	4	4
Wells	612	734
Overhead tanks	517	1,034
Green cultivation	1	1,50,000

TABLE 40

Drains in Basavangudi Range.

Div. No.	Pukka Drains (m)			Kutcha drain	Total length of the drain (m)
	Uncovered	Covered	'L' drain		
45	1,000	7,050	2,650	Nil	10,700
46	16,115	22,650	7,000	Nil	45,765
47	17,100	13,950	1,650	Nil	32,700
48	67,160	5,700	Nil	Nil	72,860
49	20,710	18,350	2,300	Nil	41,360
50	22,570	14,560	3,380	Nil	40,510
51	21,490	65,400	5,800	Nil	92,690
52	63,120	3,830	4,270	3,650	74,870
Total	2,29,265	1,51,490	27,050	3,650	4,11,455

In Table 41, list of drains requiring engineering work is presented.

Control:

a. *Tank*:

Only one major tank, Kempabhuthi Tank exists in this range. This tank measures about 14.84 ha. This tank receives sewage through main drain which causes heavy breeding of *Cx. quinquefasciatus*.

Solution:

This tank has been urged to be preserved due to its basically good location. There is already a proposal to develop the tank as a recreational spot. Therefore, it is not desirable to allow sewage from main drain to be poured into the tank and pollute the water. The tank should be essentially cleaned regularly to keep the water unpolluted and fisheries department should undertake pisci culture.

b. *Wet cultivation*:

A huge area of nearly 15 ha, is irrigated for grass cultivation by using the waste water draining from Shankarapura, Gavipura and Chamarapet areas. The wet sand with innumerable shallow pools has become a source of mosquito breeding.

c. *Storm water canal*:

There are three major storm water canals which run for several kilometres in this range. These storm water canals collect sewage and sullage and becomes the source of mosquito breeding. If proper maintenance is carried out most of the parts of the canal now breeding would be free from breeding. The major problems and their solutions in these canals are listed below.

c.1. *Shastri nagar storm water canal (1 Km.)*:

This strom water canal starts from Shastri Nagar (Jayanagar Range) and reaches Chennamma tank area and joins with the BMS college main strom water canal. This canal is partially covered. This drain is also blocked with heavy silt and grass growth which lead to the breeding of mosquitoes.

Solution:

This canal needs regular cleaning and desilting.

c.2. *BMS College storm water canal (6 Km.)*:

This canal starts from BMS college area and runs through Thyagaraya nagar, Kalyani Garden, Ittamadu (breached tank) and joins the Hosekerahalli Tank. Although the total length of the canal is 6 Km. it runs for only 2 Km. in the range. The canal is blocked with silt and vegetation growth.

Solution:

This canal also needs regular cleaning and desilting.

c.3. *Storm water canals ending with Kempabudhi Tank:* (1.5 Km.)

One canal starts from Chamarajpet 5th Main Road as box drain till the end of Appu Rao Road whereafter it is an open drain. Just near the tank the drain is diverted to an underground connection and so no sewage water is let into the tank by drain.

Solution:

Regular cleaning is essentially required to make water flow and prevent mosquito breeding.

c.4. The other canal starts from Bull Temple Road (Shankarapuram) as a box drain till 6th Cross, II Main Road, Kempegowda nagar. Then the drain runs as open drain till the end. The approximate length of the drain is 1 Km. Blockage occurs due to garbage dumping from surrounding areas.

Solutions:

1. Regular cleaning is essentially required.
2. Underground sewerage system should be provided to avoid direct latrine connections to the drain.

d. *Cesspools and cesspits*:

There are 21 cesspools and 4 cesspits in the area which can be essentially filled up. Pending filling work, they should be regularly sprayed with fenthion at the rate of 1 ppm dose.

e. *Wells and overhead tanks*:

There are 612 wells and 517 overhead tanks in the range. Breeding in wells can be prevented by releasing fish into them. Breeding in unused wells can be controlled by using expanded polystyrene balls. These can also be sealed permanently. The overhead tanks should be covered with a lid.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	12
2.	Cleaning/Deweeding	1	—	5
3.	Monitoring (Search and Evaluation)	—	5	—

WEEKLY SPRAY SCHEDULE FOR BASVANGUDI RANGE

MONDAY

Nanjappa Block, Appurao Road, Samayapura, Kempegowda Road, Mahanath layout, MGK Moorthy layout, Shankarmutt Road, V.V. Road, Vardammaniah Block. Chikkanna Garden, Lalbaugh Fort Road, Parvathipuram and APS Road.

TUESDAY

Gandhi Bazaar, North Anjaneya Temple Road, Bull Temple Road, Guttahalli main, Shankara Park, V.V. Puram, National High School Road, Govindappa Road, Krishna Road and Market Street.

WEDNESDAY

Banasankari I stage, II Block, 80 feet Road, Srinagar I Block, Srinagar Bus stand, Bank Colony, Vidya Gopala Circle, Hanumanth nagar, Anjaneya Temple Road, Gavipuram Extension and BMS College Area.

THURSDAY

Basappa layout, Ashoknagar, Thiagarayanagar, 40 feet Road, 80 feet Road, Narasimmaraja Colony, Bovi colony, East Anjaneya Road and Malligarjuna Temple Road.

FRIDAY

Ashokapillar, Mariappa Road, Vijaya College slum, R.V. Road, East end Road, Sreeram Mandir Road, and Govindappa Road.

SATURDAY

Basavangudi, Puttamangudi Road, Old Kanagapura Road, Lalbaugh West Road, Banasankari II stage, Yaruf nagar slum, Kaveri nagar slum, Bhavani slum and Karisandra.

SCHEDULE FOR CLEANING AND DEWEEDING OF DRAINS IN BASAVANGUDI RANGE

MONDAY – I & III Week

Area	*Length (m)*
Kempegowda Nagar — from Gavipuram Guddahalli to Kempabudhi tank	200
Parvathipuram — Shankar Mutt Road, 1st Cross	15
Parvathipuram — APS Road	250
Total length	465

TUESDAY – I & III Week

Area	*Length (m)*
Parvathipuram — 1st Main lane	150
Parvathipuram — APS Road	150
Parvathipuram — M. Venkatappa Road	250
Total length	550

WEDNESDAY – I & III Week

Area	*Length (m)*
Banasankari 1st stage — II Block (between 80 ft. Road and 15th 'A' Cross Rd.)	400
Thyagarayanagar — Right side of 5th Cross Road	300
Total length	700

THURSDAY – I & III Week

Area	*Length (m)*
Thyagarayanagar — 7th and 8th Cross	400
Thyagarayanagar — 9th Cross	200
Total length	600

FRIDAY – I & III Week

Area		*Length (m)*
Vijaya College slum		400
Banasankari South end Road		20
Banasankari 2nd stage — Yaruf Nagar slum — 1st Cross		300
	Total length	720

SATURDAY – I & III Week

Area		*Length (m)*
Yaruf nagar slum — 2nd Cross		300
Yaruf nagar slum — 3rd Cross		300
	Total length	600

MONDAY – II & IV Week

Area		*Length (m)*
Yaruf nagar slum — 3rd Cross		300
Yaruf nagar slum — 4th Cross		300
	Total length	600

TUESDAY – II & IV Week

Area		*Length (m)*
Yaruf nagar slum — 5th Cross		300
Banasankari — 2nd stage — 15th Cross		260
	Total length	560

WEDNESDAY – II & IV Week

Area	*Length (m)*
A.K. Colony, K.R. Road, 14th Cross to 19th Cross	400
Banasankari 2nd stage — 27th Cross (from 7th Main to Pajonithi Printers)	200
Total length	600

THURSDAY – II & IV Week

Area	*Length (m)*
Banasankari 2nd stage, Karisandra — 24th 'A' Cross	520
Banasankari 2nd stage, Karisandra — 35th Cross	100
Total length	620

FRIDAY – II & IV Week

Area	*Length (m)*
Banasankari 2nd stage, Karisandra — K.R. Road	440
Banasankari 2nd stage, Cauveri nagar — 23rd Cross	200
Total length	640

SATURDAY – II & IV Week

Area	*Length (m)*
Banasankari 2nd stage, Cauveri nagar — (small lane near subramanya Road)	200
Banasankari 2nd stage Bhavani slum Main Road	400
Banasankari 2nd stage, 24th 'B' Cross	120
Total length	720

INSECTICIDE REQUIREMENT/ANNUM:

Fenthion (82.5% E.C.)	...	...	250 lit
M.L. Oil	...	...	1,000 lit

Others:

Expanded polystyrene balls	...	...	50 Kg.

Additional Equipments:

Scrappers	...	...	20 Nos.
Spades	...	...	10 Nos.
Bonds			20 Nos.

TABLE 41

List of drains in Basavangudi range requiring environmental cleaning and engineering solutions.

Div. No.	Locality	Type of drains	Length	Width	Surface area (m^2)	Solution
45	Kempegowdanagar–Samayapura Road 2nd Main	Ce/U/C	300	0.50	150	Sealing
"	Kempegowdanagar from Kavipuram Guddahalli to Kempabudhi Tank (join near K.G. Swimming pool).	K	200	1.00	300	"
46	Parvathipuram–Shankar Mutt Road 1st Cross	Ce/U/C	15	3.00	45	"
"	Parvathipuram–2nd Main Road	Ce/U/C	300	1.00	300	"
"	Lalbaugh Fort Road	Ce/U/C	500	1.00	500	"
"	Parvathipuram–1st Main Road	Ce/UC	600	1.00	600	"
"	Basavangudi — DVG Road	Ce/U/C	150	1.00	150	"
"	Basavangudi — Bull Temple Road	Ce/U/C	800	1.00	800	"
47	Parvathipuram — 1st Main lane	Ce/U/C	150	0.50	75	"
"	Parvathipuram — 1st Main	Ce/U/C	400	0.50	200	"
48	Banasankari 1st stage 2nd Block (between 80 ft. Rd. & 15th 'A' Cross	Ce/U/C	400	0.50	200	"
49	Hanumanthanagar — 3rd Main	Ce/U/C	1,400	1.00	1,400	"
50	N.R. Colony — Shop Street	Ce/U/C	150	1.00	150	"
"	N.R. Colony — Puttamma Road	Ce/U/C	500	1.00	500	"
51	T.R. Nagar — 40 ft. Road Right side of 2nd Main	Ce/U/C	150	1.00	150	"
"	T.R. Nagar, 4th Main Road	Ce/U/C	400	1.00	400	"
"	T.R. Nagar, 5th Main Road (both side)	Ce/U/C	1,200	1.00	1,200	"
"	T.R. Nagar, 6th Main Road (both side)	Ce/U/C	1,200	1.00	1,200	"
"	T.R. Nagar, 4th Main to 3rd Cross Main drain	Ce/U/C	400	1.00	400	"
"	T.R. Nagar, 5th Main 1st Cross	Ce/U/UC	360	1.00	360	"
52	Banasankari II stage Karesandra Road 7th Main	Ce/U/C	260	1.00	260	Slab Replacement
"	Banasankari II stage — 27th Cross, 7th Main to 9th Main.	Ce/U/C	100	1.00	100	Slab to be replaced.

BASAVANGUDI

3.8. JAYANAGAR RANGE

The Jayanagar Range is situated in the southern side of the city and covers approximately 17 sq.km. area with a population of 2,59,409. The range is further divided into eight divisions. Important localities included in this range are listed in Table 42.

Breeding Habitats:

Total breeding habitats and their area are summarized in Table 43.

Some of these breeding habitats are relatively more problematic and therefore require to be defined more elaborately. These are summarized below:

Drains:

Various drains in the range were identified and measured. These are mentioned in Table 44.

Tanks:

There are three tanks in the range, i.e., Yediyur Tank, Lalbagh Tank and Doraisamypalya Tank. None of these tanks now is seriously problematic from the point of view of mosquito breeding since most of these tanks are having fish culture.

TABLE 42

Divisions and Localities in Jayanagar range.

Division No.	Name of the locality
53	Mavalli, Lalbaugh Fort Road.
54	Double Road, BTS Road, Wilson Garden, Siddapura Slum, Someswaranagar and Dayananda Slum.
55	Bannergutta Road, Pathalappa Garden, Lakkasandra, Lakkasandra Extension, Audugodi, Bangalore Dairy, Sunakal Farm and Chinnayanpalya.
56	Shanthi Talkies Road, Sakkamma Garden, Part of Kanakapura Road, Yediyur, Jayanagar VI Block and Vijayanrangam Layout.
57	Jayanagar IV Block, Byrasandra, Muslim Colony and LIC Colony.
58	Old Madivala, Madivala, Jogipalya, Chicka Audugodi, Tilaknagar, Guruppanapalya, Bovi Colony and ITI.
59	Kanakapura Road, Diagonal Road, Jayanagar VIII Block, JP Nagar 1st Phase, Sarakki Layout and ITI Layout.
60	Jayanagar IV 'T' Block, Jayanagar IX Block, JP Nagar III Phase, Maranahalli, JP Nagar II Phase and Raghigudda Slum.

TABLE 43

Measurements of various breeding habitats

Type of breeding habitats	Length (m)/No.	Surface are (sq.mt.)
Tank	3	10,00,000
Storm Water Canal	1	22,500
Drains	44,99,951	44,99,951
Cess pools	32	9,071
Cess pits	40	8,575
Wells	4,111	4,933
Overhead Tanks	6,345	12,690
Quarry pits	9	19,225

TABLE 44

Various drains in Jayanagar range.

Div. No.	Pukka Drain (m)			Kutcha drain (m)	Total length of the drair (m)
	Covered	Uncovered	L-Drain		
53	9,600	350	7,775	—	17,725
54	10,600	18,550	15,300	370	44,820
55	3,720	28,350	6,400	500	38,970
56	2,350	8,300	4,550	—	15,200
57	2,700	59,450	2,500	—	64,650
58	2,500	15,270	6,650	2,090	26,510
59	2,000	59,500	—	—	61,500
59 A	1,000	47,100	—	1,350	49,450
60	10,510	11,560	10,000	56	32,126
Total	44,980	2,48,430	53,175	4,366	3,50,951

In Tables 45 and 46, lists of drains requiring yearly cleaning and engineering work are presented.

Control:

(a) *Storm Water Canals*:

Major storm water canals in the range are described below:

a.1. *Akkipet Main Storm Water Canal (1.5 km)*:

(Storm water canal between Double Road and Hosur Road)

All along its length the drain carries sewage formed by waste water as well as latrine refuge, thereby allowing heavy mosquito breeding. The cunette of the drain is broken near Hosur Road due to which a cess pool is formed. This also causes heavy breeding.

Solutions:

1. The latrine connections should be diverted to the underground sewerage system.
2. Regular cleaning is required.
3. Engineering department must repair the cunette so that water flow could be maintained. Pending this work, the spraying with fenthion should be carried out in the cess pool at the recommended dose of 1 ppm.

a.2. *Siddhapura Storm Water Canal (1 km.)*:

This canal runs between 2nd Block of Jayanagar and Akkipet Main drain. This canal is cementlined upto Siddhapura slum whereafter it is unlined upto Hosur Road. A big cess pool has been formed in the unlined drain.Sullage and raw faeces from domestic latrines stop steady water flow through the drain which causes tremendous breeding of mosquitoes especially in the cess pool of the drain.

Solutions:

1. Dumping of garbage in the main drain should be discouraged and the drain should be cleaned regularly.
2. The unlined part of the drain should be lined.
3. Pending lining of the drain, insecticide fenthion should be sprayed in the cess pool at the dose of 1 ppm.
4. Latrine connections should be diverted to underground sewerage system.

a.3. *Bangalore Dairy Storm Water Canal (1 km)*:

This canal originates from Bangalore Dairy and runs parallel to Bannergutta Road. This passes through the MICO Industry area and finally joins the main Akkipet storm water canal near Hosur Road. The canal has accumulated silt and vegetation all along its length. This drain is unlined but recently BCC's engineering unit has begun to cementline it.

Solutions:

1. The canal should be desilted regularly and the vegetation removed completely.
2. Since the whole canal is unlined, it forms a major breeding habitat in almost all places. The BCC should line it as soon as possible.

a.4. *Madiwala Storm Water Canal (9 km.)*:

This canal runs between Jayanagar IV 'T' Block and Madiwala. This canal passes through Suddaguntepalya, Tavarekere and Madivala before reaching Agaram Tank. This entire drain is almost unlined and covered heavily with weed. Due to heavy vegetation and unlined nature of the drain, water stagnates causing small shallow pools favourable for mosquito breeding.

Solutions:

1. The drain must be lined by the BCC's engineering wing.
2. Till the above work is completed, deweeding and cleaning must be carried out.

a.4.1. *SDS T.B. Sanatorium Storm Water Canal (3 km.)*:

This canal starts from the SDS T. B. Sanatorium and passes through the Industrial Training Institute and the Bannergutta Road to finally join with Madivala storm water canal near old Madivala Road. This canal is full of silt and vegetation. This canal is lined but it is not in a good condition since the lining is damaged at many points thereby stagnating water and allowing breeding of mosquitoes.

Solutions:

1. The canal should be regularly cleaned and desilted.

2. The Engineering wing of BCC must repair all those places where lining is damaged.

a.5. *Maranahalli Storm Water Canal (3 km.)*:

It starts from Jayanagar IV Block and before reaching Doraisamypalya Tank it passes through Jayanagar V Block, Maranahalli and J. P. Nagar. This canal is completely lined and is free from pollution. Nevertheless, vegetation is heavily growing in the canal which interferes with the free flow of water in the drain.

Solution:

1. Deweeding should be essentially carried out by BCC.

a.6. *Banasankari II Stage Shastri Nagar Storm Water Canal (4 km.)*:

The Shastri Nagar Storm Water Canal starts from Shastri Nagar area and joins the sister canal originating from Banasankari II Stage near Yediyur and joins with another canal (Yediyur Tank's outlet canal) near Thyagaraja Nagar. It then passes through the bed of the breached Chennamma tank bund to Hosekerehalli Tank. This canal is filled with silt and vegetation.

Solutions:

1. The drain needs regular desilting and cleaning.
2. The unlined portion of the Yediyur Tank's outlet canal should be lined.

b. *Drains*:

The various mosquitogenic drains and their appropriate solutions are given in Table 46, in the following pages.

c. *Cess pits and cess pools*:

There are 32 cess pools but relatively large number of cess pits (40). The best way to control mosquito breeding will be to fill up those breeding habitats but as this task will take some time, the spraying should be carried out to control breeding (Tables 47 and 48).

d. *Wells and overhead Tanks*:

While breeding in the potable wells can be prevented by releasing fish such as *Tilapia* and *Gambusia*, in unused wells, breeding can be prevented by applying the Expanded Polystyrene Beads. The problem of mosquito breeding in the overhead tanks should be tackled by permanently covering the tanks leaving no gaps.

e. *Quarry pits*:

The quarry pit near BTS garrage and the two quarry pits near Banasankari Bus stop should be filled with silt and garbage to level them. All these quarries are presently full of grass and small pools breeding with mosquitoes. Fishes like *Tilapia* and *Gambusia* should be released to control the breeding of mosquitoes (Table 49).

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	24
2.	Cleaning/Deweeding	1	—	18
3.	Monitoring (Search and Evaluation)	—	9	—

WEEKLY SPRAY SCHEDULE FOR JAYANAGAR RANGE

MONDAY

Mavalli, Lalbaugh Fort Road, Double road, BTS road, Wilson Garden, Siddapura slum, Someswaranagar, Dayananda slum.

TUESDAY

Bannergutta road, Pothalappa Garden, Lakkasandra, Lakkasandra extension, Audugodi, Bangalore Dairy, Sunakal Farm and Chinnayan Palya.

WEDNESDAY

Shanthi Talkies road, Sakkamma Garden, Kanakapura road, Yediyur, Jayanagar, Jayanagar VI Block and Vijayarangam Layout.

THURSDAY

Jayanagar IV Block, Byrasandra, Muslim colony, LIC colony, Old Madivala, Madivala Jogipalya.

FRIDAY

Chicka Audugodi, Tilaknagar, Guruppanapalaya, Bovi colony, ITI, Kanakapura road, Diagonal road, Jayanagar VIII Block, JP Nagar 1st phase.

SATURDAY

Sarakki Layout, ITI Layout, Jayanagar IV 'T' Block, Jayanagar IX Block, JP Nagar III Phase, Maranahalli, JP Nagar II Phase and Raghigudda slum.

WEEKLY SCHEDULE FOR CLEANING OF DRAINS IN JAYANAGAR RANGE

MONDAY – I & III Week

Sl. No.	Locality	Length of drain (m)
1.	Someswara Nagar — 5th Main	50
2.	" — 6th Main	50
3.	" — 4th Main	200
4.	" — 3rd Cross	400
5.	" — 6th 'A' Main	400
6.	" — 6th Main	600
7.	" — 5th 'A' Main	400
8.	" — 5th Main	600
9.	Someswara Nagar Slum	100
	Total length:	2,800

TUESDAY – I & III Week

Sl.No.	Locality	Length of drain (m)
1.	Dayananda Slum	150
2.	" — 1st 'A' Cross	300
3.	" — 1st Cross	300
4.	" — 3rd Main	300
5.	" — 3rd Main	300
6.	" — 7th Cross	300
7.	" — 7th 'A' Cross	600
8.	" — 7th 'B' Cross	300
9.	" — 8th Cross	200
10.	" — 4th Cross	200
	Total Length:	2,950

WEDNESDAY – I & III Week

Sl. No.	Locality	Length of drain (m)
1.	Someswara Slum — 3rd Main	400
2.	" — 8th Cross	200
3.	" — 5th Main	300
4.	Harekempanahally	80
5.	Siddapura Slums	210
6.	Dayananda Slums	300
7.	"	300
8.	"	300
9.	" — 1st Cross	300
10.	" — 2nd Cross	300
11.	" — 3rd Cross	300
	Total length	2,990

THURSDAY – I & III Week

Sl. No.	Locality	Length of drain (m)
1.	Bannergutta Road, SR Nagar 3rd Main	400
2.	Lakkasandra 14th Cross	350
3.	" 5th Main	300
4.	Pothalappa Garden	800
5.	Audagodi Pukaraja layout	300
6.	" Banneragutta Road	100
7.	" Slum (R.H. Colony)	200
8.	"	100
9.	Wilson Garden — 3rd Cross	200
10.	" — 4th Cross	200
11.	" — 5th Cross	200
	Total length	3,150

FRIDAY – I & III Week

Sl.No.	Locality	Length of drain (m)
1.	K.R. Road, South and 1st 'A' Cross	50
2.	Yediyur 6th Block, 2nd 'A' Main East side Mouth part 1st 'A' Main	200
3.	"	50
4.	Yediyur 2nd 'D' Main to 27th Cross	100
5.	" 5th Main	150
6.	K.R. Road, Front of Balaji Education Trust	150
7.	K.R. Road to Kanakapura Road 2nd Main Vijayarangam lay out	300
8.	Old Kanakapura Road (Model House Road)	300
9.	South End Road to K.R. Road (Front of Hotel Sujatha)	500
10.	BTS Road	800
11.	Wilson Garden — 1st 'A' Cross	100
	Total length	2,700

SATURDAY – I & III Week

Sl. No.	Locality	Length of drain (m)
1.	Byrasandra, 1st Block, 3rd Main, 1st Cross	50
2.	" 7th Main, 10th Cross	500
3.	" K.V. Layout	200
4.	Tilak Nagar Slum — 26th 'B' Main	60
5.	" — 28th 'A' Main	100
6.	" — 28th 'B' Main	80
7.	Gurappanpalaya village Main Road	1,000
8.	" " "	200
9.	" — 1st Main Road	400
10.	" — side of Drive-in-Theatre	400
	Total length	2,990

MONDAY – II & IV Week

Sl.No.	Locality	Length of drain (m)
1.	Thavarekere 2nd Cross Main bridge	100
2.	" 2nd Cross	50
3.	" Main Road	1,800
4.	" Maruthi Vinayaka Temple lane	150
5.	Suddaguntepalya Main Road	600
	Total length	2,700

TUESDAY – II & IV Week

Sl.No.	Locality	Length of drain (m)
1.	Suddaguntepalya — 1st Main	400
2.	" — 1st Cross	100
3.	" — 2nd Cross	100
4.	" — 1st Main way to Anjaneya Temple	80
5.	" "	100
6.	Harijan colony — 1st Main	100
7.	" — 1st Main	100
8.	Bovi colony — 1st Main	180
9.	" — 2nd Main	300
10.	" — 3rd Main	200
11.	" — Main Road	300
12.	" — 4th Main	100
13.	" — 5th Main	200
14.	Chikka Audogodi Village — 1st Main Road	200
15.	" — 2nd Main	100
16.	" — 3rd Main	200
	Total length	2,760

WEDNESDAY – II & IV Week

	Locality	Length of drain (m)
1.	Handi Jagara Colony, side of Church	100
2.	" New Annemma Temple	100
3.	" " 2nd lane	100
4.	" " 3rd lane	100
5.	" " 4th lane	40
6.	Jogipalya between St. Medical College and St. Antony Church	200
7.	Old Nadivala, No.280, Manjunatha Store	500
8.	" No.262, Eswara Temple Lane	100
9.	" Ganesha Tutorial Front side	100
10.	Madivala Extension Cross Road	300
11.	" "	100
12.	" 2nd Cross Road	400
13.	" 1st Cross Road	400
14.	" Santhe Market	75
	Total length	2,615

THURSDAY – II & IV Week

Sl.No.	Locality	Length of drain (m)
1.	J.P.Nagar 1st Phase, Sarakki village 1st Cross	100
2.	" — 2nd Cross	150
3.	" — 3rd Cross	150
4.	" — 4th Cross	100
5.	" — 5th Cross	150
6.	Sarakki layout — 1st Cross	150
7.	" — 2nd Cross	150
8.	" — 3rd Cross	150
9.	" — 4th Cross	150
10.	" — 5th Cross	150
11.	Marenahally 14th Cross	150
12.	KSRTC Layout 1st Cross	300
13.	KSRTC Layout	300
14.	Ragigudda lane	100
15.	9th Block	100
16.	8th Cross Marenahally	300
	Total length	2,650

FRIDAY – II & IV Week

Sl.No.	Locality	Length of drain (m)
1.	Marenahally — 4th Main	800
2.	" — 3rd 'A' Main	600
3.	" — 3rd Main	600
4.	" — 4th 'T' Block 25th Main	400
	Total length	2,400

SATURDAY – II & IV Week

Sl.No.	Locality	Length of drain (m)
1.	4th 'T' Block — 31st Cross	800
2.	" — 30th 'B' Cross	500
3.	" — 31st 'A' Cross	500
4.	" — 31st 'B' Cross	500
	Total length	2,300

TABLE 45

List of drains requiring one time cleaning and deweeding

Div. No.	Locality	Type of drain	Length	Width	Surface area (m^2)
54	Someswara Nagar Road (Harekemparahally)	Ce/U/UC	400	.5	200
"	" — 1st Cross	"	400	.5	200
"	" — 2nd Cross	"	300	.5	150
"	" — 3rd Cross	"	300	.5	150
"	" — 4th Cross	"	300	.5	150
"	" — 2nd Main	"	400	.5	200
"	" — 6th Cross	"	800	.5	400
55	Kakkasandra — 1st Cross	"	400	.5	200
"	" — 1st Main	"	600	.5	300
"	" — 2nd Main	"	600	.5	300
"	Gopalappa lane	"	600	.5	300
"	Nagaraja Gupta Layout	"	300	.5	150
"	" — 1st Cross	L	300	.5	150
"	" — 2nd Cross	Ce/U/UC	600	.5	300
"	" — 3rd Cross	"	300	.5	150
"	" — 4th Main	"	600	.5	300
"	" — 6th Main	"	300	.5	150
"	" — 9th Main	"	300	.5	150
"	" — 3rd Main	"	600	.5	300
"	" — 2nd Main	"	600	.5	300
"	" — 15th Cross	"	100	.5	50

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
55	Audugodi, Hosur Road Drain	"	200	1	200
"	" — 1st Main	"	150	.5	75
"	" — 2nd Main	"	250	.5	125
"	" — 3rd Main	"	350	.5	175
"	" — 1st Cross	L	100	.5	50
"	" — 2nd Cross	L	100	.5	50
"	" — 3rd Cross	Ce/U/UC	100	1	100
"	" — 4th Cross	"	100	1	100
"	Audugodi, Pukaraja Layout	L	200	.5	100
"	BTS Main Road	Ce/U/C	500	1	500
"	Chinnayanpalya	"	400	.5	200
56	Sakumma Garden — 1st Main	"	150	.5	75
"	"	"	200	.5	100
"	Shanthi Talkies Road	"	400	.5	200
"	Vijayarangam layout — 1st Cross	L	200	.5	100
"	1st Main 6th Block	Ce/U/UC	200	.5	100
"	22nd Cross to 27th Cross 4th Main Road	"	150	.5	75
"	26th Cross, Kanakapura Road	"	150	.5	75
57	Byrasandra — 4th Main	"	400	.5	200
"	" — 1st Cross side lane	"	50	.5	25
"	" — 1st Main	"	400	.5	200
58	Old Madivala — Eshwar Temple back side	"	60	.5	30
"	" — Piroge store right side road	"	400	.5	200
"	" — In front of Perumal house	"	50	.5	25
"	" — No.132 Right side	"	50	.5	25
"	" — Poornima coffee centre	"	400	1	400
"	" — 2nd Cross Road	"	100	.5	50
"	" "	L	100	.3	30
"	" — Vinayaka Temple Street	Ce/U/UC	200	.5	100
"	" — Siddartha Colony 22nd Main Rd.	"	250	.5	125
"	" — Hosur Road Corporation Check post at St. Anthony Church Front side	"	200	.5	100
"	Gurappanapalya — public convent school	"	200	.7	140
"	" — Main Road	"	1300	.7	910
"	" — Cross Road	"	300	.7	210
"	" — Cross Road	"	300	.7	210
"	" — 1st Main	"	400	.7	280
60	4th Block — 23rd Main Road	"	150	.5	75
"	" — 22nd Main Road	"	300	.5	150
"	J.P.Nagar II Phase — 14th Cross	Ce/U/UC	800	.5	400
"	" — 27th Main	"	600	.75	450
"	" — 12th Cross	"	600	.5	300
"	" — 11th Cross	"	600	.5	300
"	" — 9th Cross	"	1000	.75	750
"	Marenahally — 3rd 'A' Main	"	600	.5	300
"	" — 3rd Main	"	600	.5	300
"	" — 2nd Main	"	600	.5	300

TABLE 46

List of drains which require engineering work.

Div. No.	Locality	Type of drain	Length	Width	Surface area (m^2)	Solution
54	Someswar Nagar — 4th Main	Ce/U/UC	200	.5	100	Grading &
"	" — 3rd Main	"	400	.5	200	sealing
"	" — 8th Cross	"	200	.5	100	"
"	" — 5th Main	"	300	.5	150	"
"	Dayananda Slums — 1st Cross	"	300	.5	150	"
"	" — 2nd Cross	"	300	.5	150	"
"	" — 3rd Cross	"	300	.5	150	"
"	Someswar Nagar — 5th Main	L	600	.3	180	"
55	Chinnaiahnapalya Wilson Garden II cross	Ce/U/C	100	.5	50	"
56	Yediyur 6th Block, 2nd Main	U/C	200	.8	160	Sealing
"	Kanakapura Road — 27th Cross	U/C	100	1	100	"
"	Tata Silk House — 3rd Main	"	200	.8	160	"
"	K.R.Road, South End Road, 27th Cross	"	300	.8	240	"
"	1st 'A' Cross	U/UC	50	.5	25	Regrading
"	South End Road towards Yediyur Tank Main Road	U/C	300	1	300	Sealing
"	Patalamma Temple Street — Yediyur	"	300	1	300	"
"	South End Road to Reservoir Street K.R.Road	"	200	1	200	"
57	Byrasandra — 26th to 27th Cross and 14th Main	Ce/U/UC	800	1	800	Replacement of slabs.
"	1st Cross (1st Block East) Small lane	"	50	.5	25	Regrading
58	Thilaknagar slum — 30 'A' Cross	Ce/U/C	250	.7	175	Sealing
"	" — 30 'C' Cross	U/C	100	1	100	"
"	" — 28th 'B' Main	U/UC	80	.7	56	Regrading
"	" — 30th Cross Road	U/C	1400	.7	980	Sealing
"	Thavarakere village Main Road	U/UC	1800	1	1800	Regrading
"	Maruthi Vinayaka Temple Lane	"	150	.7	105	"
"	Chikkadugodi village 1st Main Road	"	200	.7	140	"
"	" 2nd Main	"	200	.7	140	"
"	Madivala Extension 2nd Cross Road	"	400	.5	200	"
60	J.P.Nagar 3rd Phase	Ce/U/C	500	.5	250	Sealing
"	K.S.R. T.C. Layout — 1st Cross	"	600	.5	300	Regrading
"	" — 2nd Cross	"	600	.5	300	"
"	Jayanagar — 9th Block Radigudda Lane	"	100	.5	50	"
"	Marenahally, Jayanagar, 4th Main	"	800	.5	400	"
"	" 3rd 'A' Main	"	600	.5	300	"
"	" 3rd Main	"	600	.5	300	"
"	" 8th Cross	"	300	.75	225	"
"	Thilak Nagar 31st Cross	U/C	300	.5	150	Sealing
"	Puttaiahnapalya slums 26th Main	"	400	.5	200	"

TABLE 47

List of Cess pits requiring filling or spraying till filling.

Div. No.	Locality	Length	Width	Surface area (m^2)
54	Siddapura slums	1	.5	.5
”	”	.5	.5	.25
”	”	1	1	1
”	”	1	1	1
”	”	1	1	1
”	”	1	1	1
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	1	1	1
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	1	.5	.5
”	”	1	.5	.5
”	”	.5	.5	.25
”	6th ‘A’ Cross	1	1	1
”	”	1	.5	.5
”	”	1	1	1
”	Madavan park slums	1	.5	.5
”	”	.5	.5	.25
”	”	1	.5	.5
”	”	1	.5	.5
”	”	.5	.5	.25
”	”	.5	.5	.25
”	”	.5	.5	.25
58	New Gurappanapalya	1	1	1
”	”	2	1	2
”	”	1	1.5	1.5
”	”	2	1	2
”	”	2	2	4
”	”	2.5	1	2.5
”	”	2	1	2
”	Bommanahally Main Road side	2	2	4
”	”	3	2	6
60	Marenahally 11th ‘A’ Cross	2	1	2
”	In between 9th Cross and 27th Cross	1	1	1
”	J. P. Nagar II Phase	1	1	1
”	”	2	1	2
”	”	1	.5	.5
”	”	1	1	1
”	Ragigudda slums	1	1	1
”	9th Block Jayanagar	1	1	1
”	Marenahally layout	1	1	1
”	Low lying area	1	1	1
”	”	1	.5	.5

TABLE 48

List of Cess pools requiring filling or spraying till filling.

Div. No.	Locality	Length	Width	Surface area (m^2)	Solution
55	9th Cross, S.R.Nagar, Lakkasandra	10	6	60	Regular spraying till filling
”	Laljinagar back side of quarters, Lakkasandra	3	2	6	”
”	State Milk Dairy Quarters	10	10	100	”
”	Hosur Road	15	5	75	”
”	”	20	10	200	”
”	Pothalappa Garden Jayanagar	80	20	1600	”
”	Near Police Quarters Gare (inside) Bangalore Milk Diary Hosur Road	10	5	50	Pipe leakage BWSSB work
56	Side of Yediyur Tank west side low lying area	100	40	4000	Spray till filling
54	New Gurappanapalya	4	2	8	”
60	House No.676, 14th Cross Jayanagar	10	5	50	”
”	H.No.665, 14th Cross	20	10	200	”
”	J.P.Nagar, II Phase — 11th Cross	10	10	100	”
”	”	5	5	25	”
”	9th Cross	10	15	150	”
”	” ”	10	10	100	”
”	VET School, backside J.P.Nagar	10	5	50	”
”	VET School, Near J.P.Nagar	5	5	25	”
”	In between 9th Cross and 27th Main	5	5	25	”
”	”	7	5	35	”
”	”	10	5	50	”
”	11th ‘A’ Cross Marenahally	5	2	10	”
”	K.S.R.T.C. Layout	15	15	225	”
”	II Cross	10	15	150	”
”	Ragigudda slums 9th Block, Jayanagar	90	10	900	”
”	”	10	10	100	”
”	”	5	10	50	”
”	Marenahally Layout Low laying area	10	2	20	”
”	”	5	5	25	”
”	”	7	5	35	”
”	”	10	15	150	”

TABLE 49 List of quarry pits.

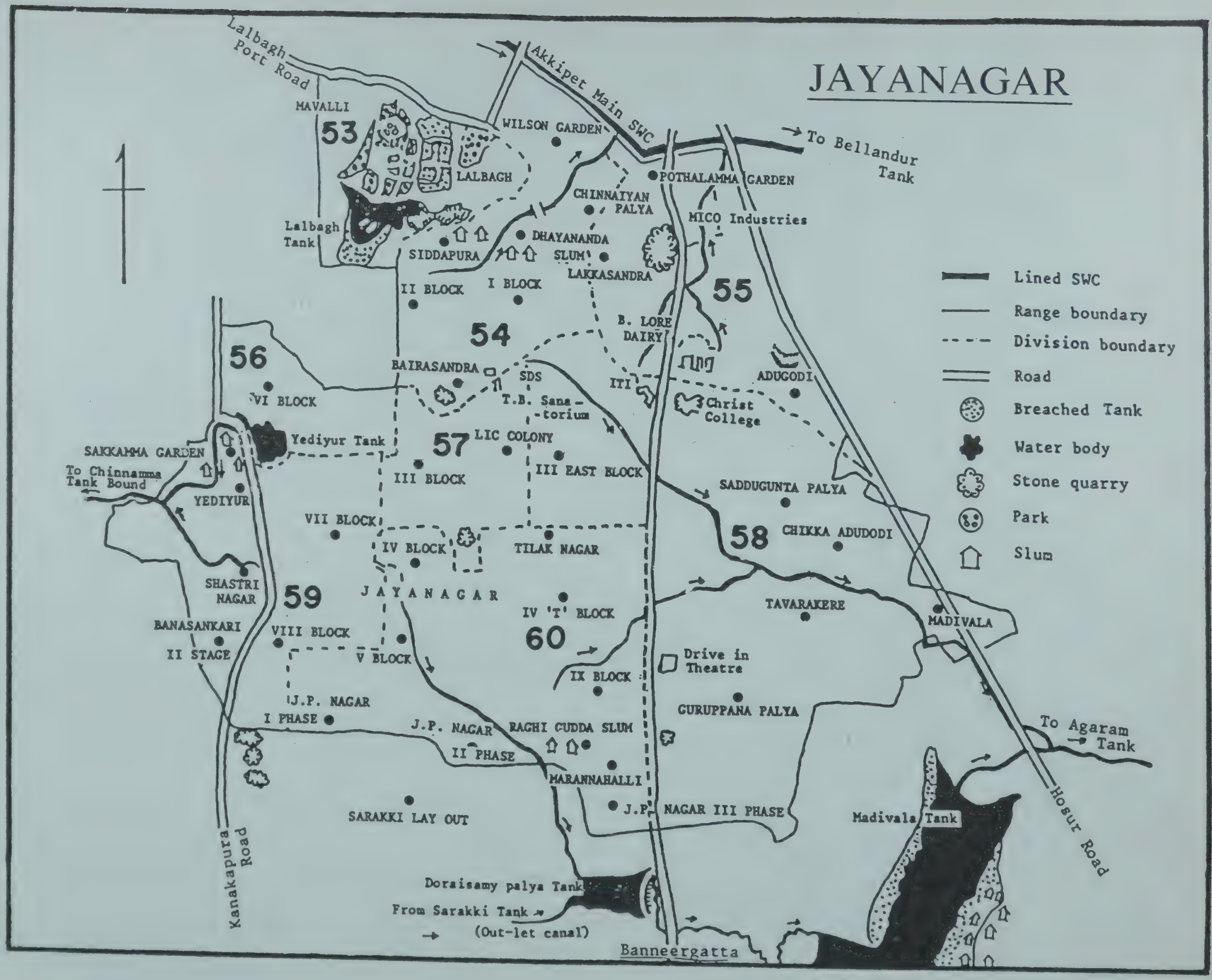
Div. No.	Locality	Length	Width	Surface area (m^2)	Solution
55	Audugodi slums (RH Colony) Jayanagar	100	50	5000	Deweeding/ Fish release
”	”	100	25	2500	
”	Lakkasandra Extesnsion	100	70	7000	”
58	Inside Dharmaram College	60	40	2400	”
60	4th Block, 23rd Main	30	20	600	”
”	36th Cross	25	15	375	”
”	J.P. Nagar II Phase 9th Cross and 27th Cross Main cutting	10	10	100	”
”	”	10	5	50	”
”	Kanakapura Main Road Banasankari II Stage	150	50	7500	”

“Not houses finely roofed nor the stones of walls well-builded; nay, nor canals and dockyards make a city, but men able to use their opportunity.

Those who fail to use their opportunity may continue to get the environments they deserve”.

—J. DOUGLAS PORTEOUS

JAYANAGAR


Lalbagh Port Road
Akkipet Main SWC
To Bellandur Tank
MAVALLI
53
WILSON GARDEN
LALBAGH
POTHALAMMA GARDEN
CHINNAIYAN PALYA
MICO Industries
Lalbagh Tank
SIDDAPURA
DHAYANANDA SLUM
LAKKASANDRA
II BLOCK
I BLOCK
55
54
B. LORE DAIRY
56
BAIRASANDRA
SDS
ITI
ADUGODI
VI BLOCK
T.B. Sana-torium
Christ College
SAKKAMMA GARDEN
Yediyur Tank
57
LIC COLONY
To Chinnamma Tank Bound
III BLOCK
III EAST BLOCK
SADDUGUNTA PALYA
YEDIYUR
VII BLOCK
58
CHIKKA ADUDODI
IV BLOCK
TILAK NAGAR
SHASTRI NAGAR
59
J A Y A N A G A R
TAVARAKERE
IV 'T' BLOCK
MADIVALA
BANASANKARI
VIII BLOCK
60
II STAGE
V BLOCK
Drive in Theatre
IX BLOCK
J.P. NAGAR
GURUPPANA PALYA
I PHASE
J.P. NAGAR
RAGHI CUDDA SLUM
To Agaram Tank
II PHASE
MARANNAHALLI
SARAKKI LAY OUT
J.P. NAGAR III PHASE
Madivala Tank
Hosur Road
Kanakapura Road
Doraisamy palya Tank
From Sarakki Tank
(Out-let canal)
Banneergatta
Lined SWC
Range boundary
Division boundary
Road
Breached Tank
Water body
Stone quarry
Park
Slum

3.9. SHANTHI NAGAR RANGE

It is situated on the eastern side of the city and covers an area of approximately 18 Sq.km. The total population in the area is 1,84,841. For mosquito control and sanitation the area is divided into eight divisions. The important localities included in this range are listed in Table 50.

Breeding Habitats:

Various kinds of breeding habitats were measured in this range and their summary is given in Table No. 51.

The most significant breeding habitats in the range are the drains which are described more elaborately below:

Drains:

Various kinds of drains were surveyed and measured in the range and they have been classified according to their make. These are lised in Table 52.

TABLE 50

Divisions and Localities in Shanthi Nagar range

Division No.	Name of the localities
61	Queens Road, Cubbon Road, Richmand Road, Residency Road, Brigade Road, HAL Road, Bunter Road, M.G. Road, Ushangnessez Road, Lavella Road and Lalbaugh Road.
62	Defence Area, Ashok nagar, Gokadapalya, Bettappa Garden, Victoria layout, Loyola layout and Xavier layout.
63	Ulsoor, Someswarapura, Saraswathipuram, Deenapandhu nagar, Linganpalya, Jougapalya and Appaiah garden.
64	Santhinagar, Vinayakanagar, Akki thimmanahalli, and Bangarappagarden.
65	Jayarajnagar, Vannarpet, Viveknagar, Austin town, Muthamma garden, Sunnanahalli slum and Lakshman Rao slum.
66	Annepalya, Neelasandra, Jakkasandra, Koramangala layout, Koramangala Industrial area, Audugodi and Davarakere Road.
67	Ulsoor, Gowthampura 1st stage, Gowthampura 2nd stage, Appareddypalya, Dumlur layout and Dukkanahalli.

TABLE 51

Measurements of various breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface Area (Sq.m.)
Storm water canals	22,000	22,000
Drain	4,27,895	4,27,895
Cesspits	24	24
Cesspools	31	4,200
Wells	103	124
Overhead tanks	815	1,630
Area under grass cultivation	2	40,00,000
Quarry pits	2	475

TABLE 52

Various types of drains in Shanthi Nagar range.

Div. No.	Pukka drains (m)			Kutcha drain (m)	Total length of the drains (m.)
	Covered	Uncovered	L-drain		
61	31,400	12,450	5,500	—	49,350
62	18,650	21,700	17,750	—	58,100
63	9,000	31,700	9,500	10	50,210
64	3,300	41,910	14,700	3,070	62,980
65	3,300	20,400	11,270	—	34,970
66	2,850	91,900	19,400	1,910	1,16,060
67	5,050	39,375	12,100	200	56,725
Total	73,550	2,59,435	90,220	5,190	4,28,395

In tables 53 and 54, lists of drains requiring yearly cleaning and engineering work are presented.

As per the above table all drains run for about 430 Km. in this range. Most of the drains are favouring the breeding of *Culex quinquefasciatus* because they are blocked with garbage, vegetation growth and silt.

Control:

(a) *Storm water canal*:

a.1. **Akkipet Main storm water canal (7 km.):**

This canal starts from Chamarajpet range and passes through Jayanagar range. It runs in this range through the following areas: Hosur Road, Annepalya, Neelasandra, Koramangala layout and finally joins with Agaram tank's outlet canal and runs to Bellandur tank. This canal is lined upto Hosur Road. From Hosur Road to Koramangala layout it is an unlined canal. From Koramangala layout to Agaram outlet canal it is a lined canal.

In this drain, cunette is found broken in many parts of the lined portion. The bed slabs are also damaged which leads to water stagnation which favours the prolific mosquito breeding. Latrine connections are also found in unlined portion; heavy breeding has been found due to blockage by garbage dumping and vegetation growth.

Solutions:

1. The unlined canal should be lined.
2. Desilting and deweeding should be carried out regularly.
3. Latrine connection should be diverted to the nearby underground sewerage system.

a.2. **Subsidiary drains of Akkipet Main canal:**

a.2.1. *Palmgrove Road Canal (4 Km.)*:

It starts near Bangalore City Corporation Work shop and runs through Ashok nagar, Richmand Road, Victoria Road, Victoria layout, Jayarajnagar, Austin Town, Neelasandra Main Road and joins the Kutcha portion of Akkipet Main Canal opposite of Bala Yesu Church. This drain is a kutcha drain upto Ashok nagar playground. In lined portions, bed slabs have been found damaged especially in Victoria layout. More number of latrine connections are found especially near Jayarajnagar. All 'U' drains carrying sewage in Jayarajnagar are found letting sewage directly into the drain.

Solutions:

1. Bed slabs should be properly constructed.

2. Unlined portion of the drain should be lined. Till that period, regular channelization should be carried out.

3. Sewage connection should be diverted to a nearby underground sewerage system.

a.2.2. *Audugodi Canal (2 Km.)*:

It starts from Audugodi and runs through National Dairy Research Institute, Lakshmanarao slum (Koramangala slum) and then it runs in open field and finally joins with Akkipet Main Canal in Koramangala layout. This canal is an unlined canal throughout its length. Due to heavy vegetation growth on the sides, water gets stagnated and so favours prolific breeding of *Cx. quinquefasciatus*.

Solution:

1. The canal should be lined. Pending regular channelization, spraying with fenthion is necessary.

a.3. **Indira Nagar Main Storm water canal (6 km.):**

This canal starts from Shivaji nagar range and passes through Bharathi Nagar Range, Shanthi Nagar Range and HAL area and then it finally joins the Bellandur Tank. In Shanthi Nagar, it runs through old Madras Road, Saraswathipuram, Appareddypalya Road, Jogupalya, Someswarapura, Dumlur, Murugeshpalya, Golf Club (Breached Chellaghatta Tank) and enters Airport runway area and then joins the Bellandur Tank. Inside the Airport compound it runs as an unlined drain. The drain has been found in a very bad condition due to heavy silt accumulation and thick growth of vegetation especially in old Madras Road, Someswarapura. In Someswarapura the water flowing in this canal is diverted to a manhole chamber. So, water flow is slow in the remaining part of the canal.

Solutions:

1. The unlined portion of the drain inside the Airport compound should be linded.

2. The drain should be regularly desilted and cleaned.

a.4. **Subsidiary canals of Indira Nagar Storm water canal:**

a.4.1. *Gowthampura Drain (2 Km.)*:

It starts from 515 Basement Workshop (Military) and goes through Gowthampura, Shiva Temple Road, Artillery Road, Deenabandhu Slum, Cambridge Road and joins the Indira Nagar Main Canal near Someswarapura. This drain was found in a worst condition due to latrine construction over the canal and heavy dumping of garbage. Vegetation growth also favours heavy breeding of *Cx. quinquefasciatus*.

Solutions:

1. Latrine should not be constructed over the canal.

2. The canal should be regularly desilted and cleaned.

a.4.2. *Dukkanahalli Canal (1 Km.)*:

It starts from Mottappanpalya and runs through Dukkanahalli and joins the Indira Nagar Main Canal near Dumlur. Eventhough it is a lined drain there is heavy growth of vegetation which blocks the free flow of water.

Solution:

1. Deweeding is necessary.

b. *Wet cultivation*:

Approximately 40,00,000 Sq.m. area of the range is under wet cultivation. Since sewage is used for grass cultivation there are lot of cesspools found in the fields. These pools should be levelled up with the soil from elevated area. Until this is done, these patches breeding mosquitoes should be sprayed regularly with the recommended dose of fenthion.

c. *Cesspits and Cesspools*:

There are 24 Cesspits and 31 Cesspools in this range. They should be filled up with silt removed from the nearby drains. Wherever filling is not possible, regular spraying should be carried out with fenthion (Tables 56 and 57).

d. *Wells and Overhead tanks*:

Altogether 103 wells and 815 overhead tanks exist in the range, but less than 1% of them are found breeding. While breeding in the potable wells can be easily prevented by releasing fish such as *Tilapia* and *Gambusia*, in the unused wells, breeding can be prevented by applying the Expanded Polystyrene Beads at the rate of 500 gm/Sq.m. The problem of mosquito breeding in the overhead tanks should be tackled by permanently covering the tanks.

e. *Quarry pits*:

There are only two quarry pits which are full of weed. Since water accumulating in these pits is turbid, the pits may form potential breeding grounds for mosquitoes. These pits should therefore be filled as a permanent measure (Table 57).

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	24
2.	Cleaning/Deweeding	1	—	22
3.	Monitoring (Search and Evaluation)	—	10	—

WEEKLY SPRAY SCHEDULE FOR SHANTHI NAGAR

MONDAY

Queens Road, Cubbon Road, Richmand Road, Residency Road, Brigade Road, HAL Road, Bunter Road, M. G. Road, Ushangnessez Road, Lavella Road, Lal baugh Road, Defence Area, Ashok nagar, Gokadapalya, Bettappa Garden and Victoria Layout.

TUESDAY

Loyola layout, Xavier layout, Someswarapura, Saraswathipuram, Deenapandhu nagar, Linganpalya, Jougapalya and Appaiah Garden.

WEDNESDAY

Shanthi Nagar, Vinayakanagar, Akki Thimmanahalli and Bangarappa Garden.

THURSDAY

Jayarajnagar, Vannarpet, Viveknagar, Austin Town, Muthamma Garden, Sunnanahalli slum and Lakshman rao slum.

FRIDAY

Annepalya, Neelasandra, Jakksandra, Koramangala layout, Koramanagala Industrial area, Adugodi and Davarakere Road.

SATURDAY

Ulsoor, Gowthamapura 1st Stage, Gowthamapura 2nd stage, Appareddypalya, Dumlur layout and Duddanahalli.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN SHANTHI NAGAR RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Ashok Nagar — Venkataswamy Naidu Slum	300
Ashok Nagar — Brobe lane	100
Austin Town — Abraham Street	600
Saraswathipuram — 1st Main	800
Jogpalya — Main Road, 'C' Street	1,000
Total length	2,800

TUESDAY – I & III Week

Locality	*Length (m)*
Basappa Road	700
Lakshmi Road — 2nd Cross	100
Akki Thimmanahalli	10
Rachappa Garden	600
Between Double Road and BTS Quarters	200
BTS garage shed infront of canteen	400
Canteen backside	400
Vinayakanagar — 9th Cross	600
Total length	3,010

WEDNESDAY – I & III Week

Locality	*Length (m)*
Vinayakanagar — 8th Cross	200
Vinayakanagar — 4th Cross	250
Vinayakanagar — 5th Cross	300
Vinayakanagar — 6th and 7th Cross	550
Vinayakanagar — 1st Cross	300
Vinayakanagar — 3rd Cross	300
Vinayakanagar — A and B Cross	100
Jalakanteswara — 2nd Cross	115
Vinayakanagar — 2nd Main 1st Cross	50
Vinayakanagar — 2nd Main 2nd Cross	50
Koramangala 1st Stage — 4th cross	150
Lakshmanrao nagar Slum — 1st, 2nd and 3rd Cross	550
Total length	2,915

THURSDAY I & III Week

Locality	*Length (m)*
Lakshman Rao Slum — Main Road	500
Lakshman Rao Slum — 22nd Cross	100
Lakshman Rao Slum — 23rd Cross	100
Lakshman Rao Slum — 16th Cross	100
Lakshman Rao Slum — 15th Cross	100
Lakshman Rao Slum — 14th Cross	100
Lakshman Rao Slum — 13th Cross	100
Lakshman Rao Slum — 12th Cross	100
Lakshman Rao Slum — 11th Cross	100
Lakshman Rao Slum — 9th Cross	100
Lakshman Rao Slum — 8th Cross	100
Lakshman Rao Slum — 36th Cross	60
Lakshman Rao Slum — 35th Cross	60
Lakshman Rao Slum — 34th Cross	60
Lakshman Rao Slum — 33rd Cross	60
Lakshman Rao Slum — 30th Cross	100
Lakshman Rao Slum — 29th Cross	100
Koramangala 2nd Stage — Rajendra nagar — 1st Main	700
Koramangala 2nd Stage — Rajendra nagar — 2nd Main	200
Total length	2,840

FRIDAY – I & III Week

Locality	*Length (m)*
Koramangala 2nd Stage — Rajendra nagar — 3rd Main	400
Koramangala 2nd Stage — Rajendra nagar — 4th Main	400
Koramangala 2nd Stage — Rajendra nagar — 5th Main	400
Koramangala 2nd Stage — Rajendra nagar — 6th Main	300
Koramangala 2nd Stage — Rajendra nagar — 7th Main	400
Koramangala 2nd Stage — Rajendra nagar — 8th Main	400
Koramangala 2nd Stage — Rajendranagar — 9th Main	400
Koramangala 2nd Stage — Rajendra nagar — 10th Main	400
Total length	3,100

SATURDAY – I & III Week

Locality	*Length (m)*
Jayaraj Nagar, Vannarapet Main	700
John bull Street	100
R.C. Ukkadapalya Main Road	50
Jayaraj Nagar 'A' Street	250
Side of Corporation High School	50
Jayaraj Nagar 'B' Street	250
'C' Street	250
'D' Street	120
Towards Jayaraj nagar from Austin town Dorab Sethi Street	100
Austin Town	
Rudrappa Garden	300
VI Cross	100
VII Cross	100
VIII Cross	50
IX Cross	50
X Cross	100
XI Cross	100
XII Cross	100
XII Cross	100
	150
Total length	2,920

MONDAY – II & IV Week

Locality	*Length (m)*
John bull street Austin town opposite to Corporation High School	
Sunnenahalli Slum	
V Cross	100
VI Cross	100
VII Cross	100
VIII Cross	100
IX Cross	100
X Cross	100
Koramangala Rajendra Nagar II Stage	
I Cross	100
II Cross	180
III Cross	250
IV Cross	100

Locality		*Length (m)*
V Cross		100
VI Cross		300
VIII Cross		100
IX Cross		250
XVI Cross		60
XVII Cross		300
XI Main Road		400
	Total length	2,740

TUESDAY – II & IV Week

Locality	*Length (m)*
Austin Town, Muthamma Garden Slum	
Jayappa Block	100
Parthayamma house cross	20
Mayabazaar Slum	
Balaji theatre behind I Lane	100
II Lane	50
III Lane	100
IV Lane	100
V Lane	100
VI Lane	100
VII Lane	100
VIII Lane	50
Balaji theatre road side Meenakshi Fabrics	600
Sunnenahalli Slum	
1st Cross	100
2nd Cross	100
3rd Cross	100
4th Cross	100
2nd Main	600
Vannarapet III Cross	300
Total length	2,720

WEDNESDAY – II & IV Week

Locality	*Length (m)*
Vannarpet IVth Cross	300
Koramangala village road, Audugodi NDRI compound to 5th Cross	400
A. K. Colony	160
Annapalya Bazaar Street	
1st Cross	280
'A' Cross	160
'B' Cross	80
'E' Cross	240
'G' Cross	80
Ulsoor, Gowthamapuram I Stage	
Artillary Road	200
2nd Main	150
Gowthamapuram slum	200
Appareddypalya I Cross	100
Appareddypalya II Cross	100
Appareddypalya III Cross	100
Conservancy Lane	50
I Main infront of Yellamma temple	100
Double road Indra Nagar II Stage	100
Total length	2,800

THURSDAY – II & IV Week

Locality	*Length (m)*
Appareddypalya IV Cross	300
Motappanapalya	150
Dharmaraja Temple Road	400
HAL II Stage Indra Nagar II Cross	25
Dumlur Layout Service Road	150
1st 'C' Cross	150
From I Main to I 'A' Cross	100
Dumlur	
2nd Cross	300
2nd 'B' Cross	200
3rd Cross	200
I 'C' Main	300
2nd Main	200
A. K. Colony 4th Main	400
Total length	2,875

FRIDAY – II & IV Week

Locality	*Length (m)*
Dumlur A.K. Colony	
A.K. Colony V Main	400
VI Main	400
VII Main	400
VIII Main	200
VI Cross	300
VII Cross	500
Shanti Nagar	
A. K. Colony VI Cross	300
VII Cross	300
VI Main	200
Total length	3,000

SATURDAY – II & IV Week

Locality	*Length (m)*
Shanthi Nagar, A. K. Colony	
3rd Cross to 7th Cross	400
5th Main	200
4th Main	400
3rd Main	200
2nd Main	300
Dumlur Layout	
13th Cross	200
15th Cross	150
11th Cross	500
Service Road	500
Dookanahalli Layout 3rd Cross	50
Total length	2,900

INSECTICIDE REQUIREMENT/ANNUM

Fenthion (82.5% E.C)	...	...	500 lit.
M.L. Oil	...	...	2,000 Lit.

Others:

Expanded Polystyrene balls	...	...	100 Kg.

Additional Equipment:

Scrappers	...	...	20 Nos.
Spades	...	...	10 Nos.
Bonds	...	...	20 Nos.

TABLE 53

List of drains in Shanthinagar range requiring onetime cleaning

Div. No.	Locality	Type of drain	Length	Width	Surface area (m^2)
61	Sampangi Tank Road	U/C	600	1	600
"	Rajarammohan Rai Road	LD	800	.3	240
"	"	U/C	800	1	800
"	H.A.L. Road Midfond garden Road	LD	300	.3	90
"	From R.S. Road to	U/UC	200	.7	140
"	Commission Road	U/C	200	1	200
63	Jogpalya Main Road	U/UC	800	.5	400
"	G.No.13th, 14th street	U/UC	400	.5	200
64	Main Santhinagar A,B,C,D,E,F,G and H Streets	LD	3,500	.3	1050
"	Shanthinagar Main Road police quarters	UD	1,400	.5	700
"	A street to H street	LD	3,500	.3	1050
"	Swasthi Road	LD	300	.3	90
"	Basappa Road Lakshmi Road 2nd Cross	U/UC	200	.5	100
"	Swasthi Road	LD	300	.5	150
"	Nanjappa Road	U/UC	700	.5	350
"	Lakshmi Road	U/UC	200	.5	100
	Bangiyappa garden (Shanthi nagar) 1st Main	Ce/U/UC	1400	.5	700
"	"	"	600	.5	300
65	Balayesu church Temple Road	Ce/U/UC	800	1	800
"	Side Road	"	300	.75	225
66	Jakkasandra 3rd Block (Koramangala Layout) 7th Main	"	1600	.75	1200
"	2nd Cross 3rd 'A' Block	"	400	.5	200
"	2nd 'A' Cross "	"	400	.5	200
"	2nd 'B' Cross "	"	400	.5	200
"	7th Cross	"	1600	.75	1200

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
66	8th Main	Ce/U/C	400	.5	200
”	”	Ce/U/UC	400	.5	200
”	8th ‘A’ Main	”	400	.5	200
”	I Cross	”	600	.5	300
”	II Cross	”	600	.5	300
”	III Cross	”	600	.5	300
”	IV Cross	”	600	.5	300
”	V Cross	”	600	.5	300
”	8th Main to 8th A Cross	”	500	.75	375
”	”	”	500	.5	250
”	11th Main	”	600	.5	300
”	12th Main	”	600	.5	300
”	13th Main	”	100	.5	500
”	4th Main (4th cross to 4th ‘B’ Block)	Ce/U/UC	1000	.75	750
”	II Main (4th cross to 4th Block)	”	1000	.5	500
”	5th ‘A’ Main	”	200	.5	100
”	5th ‘B’ Main	”	200	.5	100
”	5th ‘C’ Main	”	200	.5	100
”	5th ‘D’ Main	”	200	.5	100
”	5th ‘A’ Main	”	200	.5	100
”	6th ‘A’ Main	”	200	.5	100
”	6th ‘B’ Main	”	200	.5	100
”	7th ‘A’ Main	”	200	.5	100
”	Koramangala Layout				
”	VI Cross	”	600	.5	300
”	VII Cross	”	600	.5	300
”	VIII Cross	”	400	1	400
”	Hosur Road N.D.R.I. Compound	”	200	.75	150
”	Koramangala Village	K.D.	500	.75	375
”	N.D.R.I. Compound to 5th Cross (Near Usha Radio)	Ce/U/UC	400	.5	200
”	Neelasandra, Annepalya I Cross	LD	400	.5	200
”	” ‘A’ Cross	LD	200	.5	100
”	” ‘C’ Cross	LD	200	.5	100
”	” ‘D’ Cross	LD	200	.5	100
”	” 4th Cross	LD	500	.5	250
”	” 6th Cross	D	600	.5	300
”	” 7th Cross	LD	600	.5	300
”	” 10th Cross	LD	600	.5	300
”	14th Main	Ce/U/UC	600	.5	300
”	15th Main	”	600	.5	300
”	4th ‘A’ Cross	”	600	.5	300
”	4th ‘B’ Cross	”	600	.5	300
”	4th Cross	”	1000	.5	500
”	2nd Cross	”	800	.5	400
”	2nd ‘A’ Cross	”	800	.5	400
”	Koramangala Layout *3rd Block*				
”	3rd ‘A’ Cross	Ce/U/UC	800	.5	400

Div. No.	Locality	Type of drain	Length	Width	Surface area in sq.mt.
66	5th Cross	Ce/U/UC	1200	.5	600
”	8th ‘B’ Main	”	400	.5	200
”	8th ‘C’ Main	”	400	.5	200
	Koramangala Layout *I Block*				
”	I Main [I Cross to 4th Cross]	”	300	1	300
”	” ”	”	300	.75	225
”	II Main [I to 4th Cross]	”	300	.75	225
”	III Main [I to 4th Cross]	”	600	.5	300
”	II Cross [I to V Main]	”	800	.5	400
”	III Cross [I to V Main]	”	800	.5	400
”	IV Cross [I to IV Main]	”	800	.5	400
”	I Cross [IV to VII Main]	”	800	.5	400
”	II Cross [IV to VII Main]	”	800	.5	400
”	III Cross [IV to VII Main]	”	800	.5	400
”	IV Cross [IV to VII Main]	”	800	.5	400
”	Mazid street 15th Cross	”	150	.7	105
”	Central Street	”	100	.7	70
”	Mariamma Temple Street	”	150	.7	105
”	A.K. Colony	LD	300	.5	150
”	I Cross	LD	160	.5	80
”	A.K. Colony II Cross	LD	160	.5	80
”	” III Cross	LD	160	.5	80
”	” Small Lane	LD	100	.5	50
”	Bazaar St. I Cross	LD	150	.5	75
”	”	KD	150	.5	75
67	Appa Reddy palya from Metappanapalya to BDA Road Cross	Ce/U/UC	200	.5	100
”	Dokanahally, Yellammana Temple Road	Ce/U/UC	200	.5	100
”	3rd ‘A’ Cross Road	LD	50	.5	25
”	13th Main Road	Ce/U/UC	1000	.5	500
”	I Cross Road	”	400	.5	200
”	No.39, Dookanahally	”	100	.5	50
”	Lanford Town Berling	Ce/U/UC	1000	.5	500

TABLE 54

List of drains in Santhinagar range requiring engineering work

Div. No.	Locality	Type of drain	Length	Breadth	Surface area (m^2)	Solution
61	Brigedier (From Maganth Road to Hosur Road circle) Road	U/C	2000	1	2000	Sealing of gaps
62	Ashoknagar — Hosur Brigedier Rd.	”	800	1	800	”
”	Residency and Richmond Road Mannam Road to Commissioner St.	”	600	1	600	”

Div. No.	Locality	Type of drain	Length	Breadth	Surface area (m^2)	Solution
”	Palmgrove Road	”	600	1	600	”
”	Austin Town 7th Block	”	100	1	100	”
”	Victoria layout	”	400	1	400	”
63	Deenabandunagar I Cross Gowtham nagar	U/C	400	1	400	Replacement of slabs
”	Jogpalya main Road	U/UC	800	.5	400	Regrading
”	Linganpalya Munisamappa Road	”	800	.7	560	Regrading
”	Side of Marappa Road	U/C	500	1	500	Sealing of gaps
”	Saraswathipuram I Main	U/UC	800	1	800	Regrading
”	Jogpalya main Rd. ‘G’ St. and ‘C’ St.	U/UC	1000	.5	500	Regrading
64	Vinayakanagar I Main	Ce/U/UC	400	.5	200	Dead end gradient
”	” Big Road	”	600	.5	300	”
”	Jalakanteswara Main Road	”	600	.5	300	”
”	Vinayakanagar II Main Rd. both side	”	600	.5	300	”
64	Vinayakanagar I Cross	Ce/U/UC	400	.5	200	Gradient dead end
”	” II Cross	”	400	.5	200	”
”	Narayana slums — I Main	”	400	.5	200	”
”	” II Main	”	400	.5	200	”
62	Ashokanagar, Venkatasamy naidu slums	”	400	.5	200	Regrading
”	Austin town Abraham Street	”	600	.5	300	”
64	Shanthinagar Andre Road 2nd Cross	”	100	1	100	Replacement of slabs
”	Central Street (Akkthimmanahally) Shanthinagar	”	600	.7	420	”
65	Lakshman Rao Nagar slums Koramangala I Stage	”	500	1	500	Regrading
”	Main Road	”	500	1	500	Regrading
”	Rajendranagar, Koramangala					
”	II Stage	”	200	.3	60	Regrading
”	II Main	”	400	.7	280	”
”	III Main	”	400	.7	280	”
”	IV Main	”	400	.7	280	”
”	V Main	”	300	.7	210	”
”	VI Main	”	400	.7	280	”
”	VII Main	”	400	.7	280	”
”	VIII Main	”	400	.7	280	”
”	IX Main	”	400	.7	280	”
”	X Main	”	400	.7	280	”
”	11th Main Road	”	60	.7	42	”
”	16th Cross	”	300	.7	210	”
”	17th Cross	”	250	.7	175	”
”	8th Cross	Ce/U/UC	100	.7	70	Regrading
”	6th Cross	”	300	.7	210	”

Div. No.	Locality	Type of drain	Length	Breadth	Surface area (m^2)	Solution
”	5th Cross	”	100	.7	70	”
”	4th Cross	”	100	.7	70	”
	3rd Cross	”	250	.7	175	”
”	I Cross	”	100	.7	70	”
”	Jayanagar, Vannarapet Main Road	”	700	.7	490	”
”	” ”	Ce/U/UC	600	.7	420	Replacement of slabs.
”	” A street	LD	250	.3	75	Regrading
”	” B street	LD	250	.3	75	”
”	” C street	LD	250	.3	75	”
”	” D street	LD	120	.3	36	”
65	Austin town, Dorabsethi street yerappa garden	Ce/U/UC	200	1	200	Regrading
”	Sandeshi Road	Ce/U/C	200	1	200	Replacement of slabs
”	Rudrappa garden	”	250	.7	175	Sealing of gaps
”	I Lane	”	50	.3	15	”
”	II Lane	”	50	.3	15	”
”	III Lane	”	50	.3	15	”
”	IV Lane	”	100	.3	30	”
”	V Lane	”	50	.3	15	”
”	Main Road Rudrappa Garden	LD	300	.3	90	Regrading
”	IV Cross	LD	100	.3	30	”
”	VII Cross	LD	100	.3	30	”
”	VIII Cross	LD	50	.3	15	”
”	IX Cross	”	50	.3	15	”
”	X Cross	”	100	.3	30	”
”	XI Cross	”	100	.3	30	”
”	XII Cross	”	100	.3	30	”
”	Austin town, Muthamma Garden					
”	5th Block Industrial area Koramangala layout, ‘A’ Cross Rd.	Ce/U/UC	200	.5	100	Regrading
”	‘B’ Cross Road	”	200	.5	100	Regrading
66	Neelasandra, Annepalya 2nd Cross	Ce/U/C	100	1	100	Replacement of slabs
67	Gowthamapura I Stage (Ulsoor) (From Cambridge Rd. to Bazzar st.)	Ce/U/C	250	.5	125	”
”	Artillery Road (From Bangalore Montessery High School to 3rd Cross).	”	150	1	150	”
”	From 3rd Cross to I Cross	”	150	1	150	”
”	Appa Reddypalya Maheswaramma Temple Road	”	200	.5	100	Sealing of gaps
”	Shanthinagar A.K. Colony (From 3rd Main to 7th Main)	”	150	1	150	Replacement of slabs.
”	Dumlur layout CPWD Quarters	”	200	.5	100	”

TABLE 55

List of Vacant plots and cesspools in the Shanthinagar range

Div. No.	Locality	Length	Breadth	Surface area (m^2)	Solution
64	Vinayakanagar 8th Cross	20	20	400	RC/Spray till filling
,,	,, ,,	20	10	200	,,
,,	,, 6th Cross	20	10	200	,,
,,	,, ,,	20	10	200	,,
,,	,, ,,	5	5	25	,,
,,	,, 5th Cross	20	10	200	,,
,,	,, 4th Cross	5	5	25	,,
,,	New Cross 'B'	20	10	200	,,
,,	Jalakanteswara Main Road	20	15	300	,,
,,	,,	10	10	100	,,
,,	Jalakanteswara I Cross	10	10	100	,,
,,	,,	15	10	150	,,
,,	,,	5	5	25	,,
,,	,,	5	5	25	,,
,,	Jalakanteswara area	5	5	25	,,
,,	,,	4	3	12	,,
,,	,,	3	3	9	,,
,,	Vinayakanagar II Main I Cross	20	10	200	,,
,,	,,	8	5	40	,,
,,	,,	20	10	200	,,
,,	,, II Main, II Cross	20	10	200	,,
		3	4	12	,,
65	Lakshman Rao slums — Koramangala I Stage Main Road	3	3	9	,,
,,	Rajendranagar, Koramangala II Stage open field	10	10	100	,,
,,	,, ,,	8	15	120	,,
,,	,, ,,	20	25	500	,,
,,	Koramangala layout I Block 7th 'A' Main side.	10	3	30	,,
,,	5th Block Industrial area 'B' Cross Rd.	5	5	25	,,
,,	Near Jothi enterprises	5	5	25	,,
,,	Koramangala Annapalya bazaar St. 3rd Cross	12	5	60	Cleaning & spray upto filling.
,,	Neelasandra Annepalya 10th 'A' Cross	30	15	450	,,

TABLE 56

List of Cesspits in the Shanthinagar range

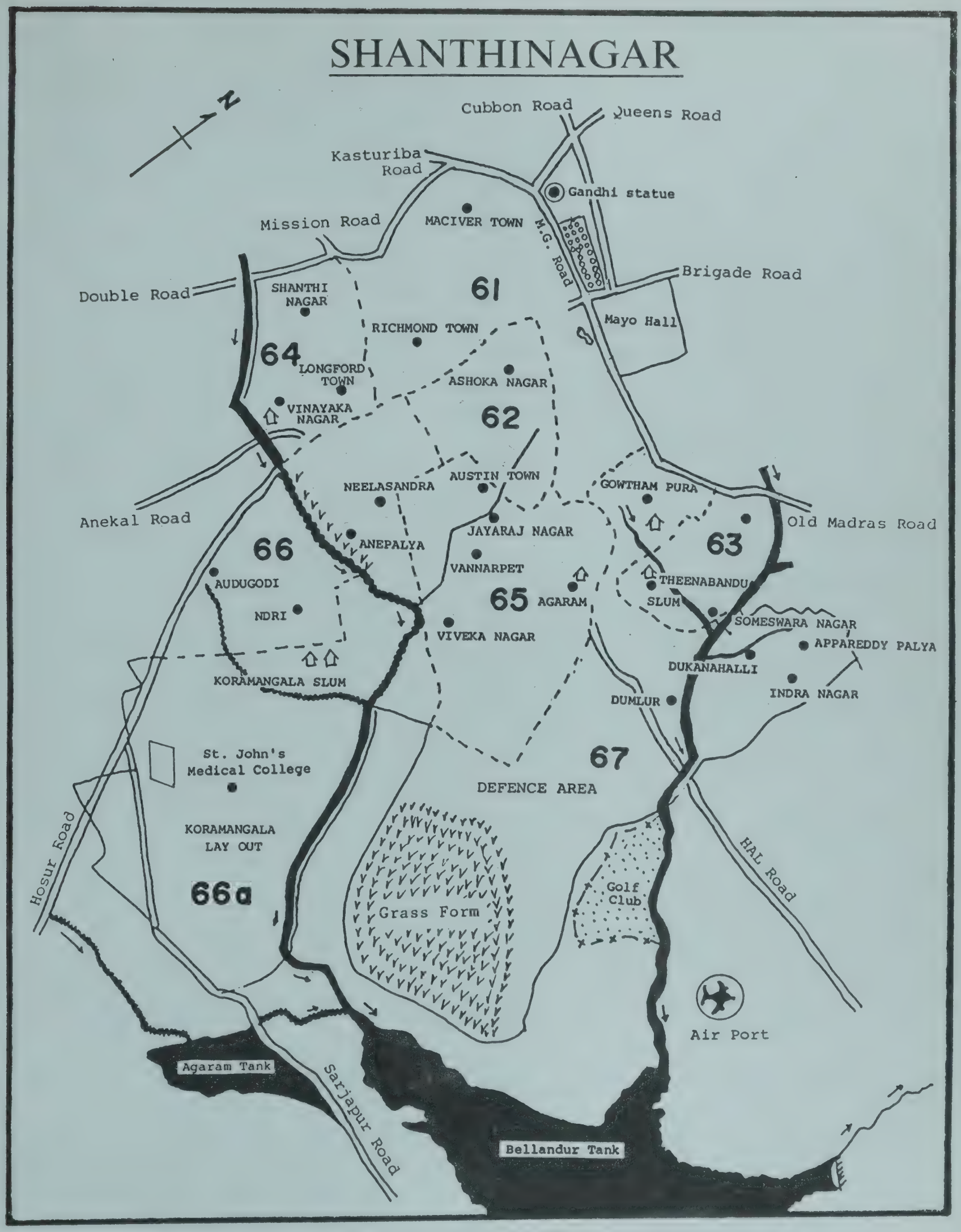
Div. No.	Locality	Length	Breadth	Surface area (m^2)	Solution
64	Jalakanteswara I Cross	1	.5	.5	Spray till filling
,,	,,	.5	.5	.25	,,
,,	Jalakanteswara area	1	.5	.5	,,
,,	,,	1	.5	.5	,,
,,	,,	.5	.5	.25	,,
,,	,,	.5	.5	.25	,,
		.5	.5	.25	,,
,,	Vinayakanagar II Main I Cross	1	.5	.5	,,
65	Lakshman Rao slums Koramangala I Stage 20th Cross Left side	1	1	1	RC/Spray
,,	John bull street Austin town	1	1	1	,,
,,	Krishnappa garden	1	1	1	,,
,,	Drowpathiamman Temple	1	1	1	,,
,,	,,	1	1	1	,,
,,	,,	1	1	1	,,
,,	,,	2	2	4	,,
,,	Venkatappa garden slums	1	1	1	,,
,,	,,	1	1	1	,,
,,	,,	1	1	1	,,
,,	Hosur Road Cross A.K. Colony	5	3	15	,,
,,	,,	6	3	18	,,
,,	Koramangala, Annapalya Bazaar St. Antony house (E)	5	2	10	,,
,,	Govindamma house	5	2	10	,,
,,	Hannu Batrib House (B)	8	2	16	,,
67	Appareddypalya — Indranagar ESI Quarters	3	2	6	RC/Spray

TABLE 57

List quarry pits in the Shanthinagar range

Div. No.	Locality	Length	Breadth	Surface area (m^2)	Solution
	Koramangala layout Backside of St. Johns Medical College	25	10	250	Cleaning
	Jothi Line Main Road	15	15	225	,,

SHANTHINAGAR



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16.50

3.10. SHIVAJI NAGAR RANGE

Shivajinagar range is situated on the northern side of the city and covers approximately 9 Sq.km. area. Total population residing in this area is around 1,34,134. For mosquito control and sanitation purpose whole area is divided into six divisions. The important localites included in this range are listed in Table 58.

Breeding Habitats:

Various kinds of breeding habitats in this range were measured and their summary is given in the table 59.

Drains:

All drains combinedly run for nearly 272 Km. in the range. However, drains in Miller tank and Sampangiram nagar have been found choked with garbage and silt. Hence these drains will need be specifically attended to. (Table 60.)

TABLE 58

Divisions and Localities in Shivaji Nagar range.

Division No.	Name of the locality
68	Shivajinagar, Kodhandaramanagar and Sultan nagar.
69	Shivaji Road, Old Bamboo bazar, Old Korachara palaya, Miller Tank, Thimmaiah Road and Slaughter House Road.
70	Shivaji Road, Poura Karmikar Lane, Shivaji nagar and Chandi Chowk Road.
71	Annaiappa Block, Kumarapark West, Vasanthanagar and Miller Tank Slum.
72	University Area, Tasker Town and Payappa Garden.
73	Karagappa garden and Sampangirama Nagar.

TABLE 59

Measurements of various types of breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface Area (Sq.m.)
Storm water canal	8,500	8,500
Cesspits	37	37
Cesspools	4	6,700
Wells	381	457
Overhead tanks	592	1,184

TABLE 60

Measurements of various drains in all six divisions of the Range.

Div. No.	Pukka drains			Kutcha drain (m)	Total length of the drain (m)
	Covered	Uncovered	L-drain		
68	25,925	2,800	10,250	—	38,975
69	13,425	3,225	11,250	—	27,900
70	32,210	1,900	15,300	—	49,410
71	33,050	30,750	10,850	200	74,850
72	31,325	7,925	7,100	—	46,350
73	13,950	11,750	9,185	—	34,885
Total	1,49,885	58,350	63,935	200	2,72,370

In Tables 61 and 62, lists of drains requiring engineering work and yearly cleaning are presented.

Control:

a. **Storm water canal:**

a.1. *Indiranagar main storm water canal (4 km.)*:

This canal starts from Vasanthanagar as box drain and runs through Millers Road, B. K. Garden, Police quarters, Queens Road, Nalla Road, Old market in Shivajinagar, Kodhandaram nagar, Kamaraj Road and enters into Bharathi nagar Range.

This canal has accumulated plenty of silt at many points and a lot of vegetation has grown along the base and sides of the canal. Broken cunette and bed slabs also lead to water stagnation especially from P.K. Colony to Police Quarters. In Nalla Road, many broken manhole chambers are found in the drain which lead to heavy flow of sewage into the drain. Latrines are also found directly connected to the drain. Garbage dumping near market areas further aggravate the problem.

Solutions:

1. Bed slabs should be repaired with a construction of cunette.
2. Latrine connections should be diverted to a nearby underground sewerage system.
3. Man-hole chambers should be properly closed for avoiding leakage of sewage.
4. Regular cleaning and desilting work should be carried out.

a.2. *Cubbon Park drain (4.5 Km.)*:

This drain starts from Basaweswara Circle as a box drain for a length of 100 m. Then the drain runs through Palace Road, Rastrya Chemical Factory, Post Office Road, Cubbon Park, Kasturiba Road, Kanteerava Stadium area, Raja Ram Mohan Roy Road, Raja Ram Mohan Roy Circle, Sampangiram Nagar and Lal baugh Road and enters into Chamarajpet Range and finally joins the Akkipet Main Storm water canal near Sudama Nagar. This canal is a covered drain from Raja Ram Mohan Roy Road to Lalbaugh Road (Sambangiram Nagar area). In some places of the drain, heavy growth of vegetation over the accumulated silt leads to water stagnation and heavy breeding. There are lot of latrines directly connected to the drain near Srinivasa Colony. The drain is an unlined drain in Cubbon Park area and the growth of vegetation on the sides block the free flow of water.

Solutions:

1. Regular desilting and cleaning should be carried out.
2. Latrines should be connected to a nearby underground sewerage system.
3. The unlined portion of the drain should be lined.

(b) **Cesspits and Cesspools:**

There are 37 Cesspits and 4 Cesspools in this Range. As a permanent measure, these habitats should be closed with silt and debris collected from the drains under cleaning. However, pending this work, these can be regularly sprayed with fenthion at the optimum dose of 1 ppm. (Tables 63 and 64.)

(c) **Overhead tanks and wells:**

Totally 381 wells and 592 overhead tanks are in the range but only less than 1% of these habitats has been found breeding. Breeding in drinking water wells can be easily prevented by releasing larvivorous fish like *Tilapia* and *Gambusia*. The unused wells can be closed or breeding can be prevented by applying EPS at the rate of 500 gm/ Sq.m. The problems of mosquito breeding in the overhead tanks should be tackled by permanently covering the overhead tanks leaving no gaps at all at the point of sealing.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	11
2.	Cleaning/Deweeding		—	6
3.	Monitoring (Search and Evaluation)	—	5	—

WEEKLY SPRAY SCHEDULE FOR SHIVAJI NAGAR

MONDAY

Shivajinagar, Kodhandarama Nagar and Sultan Nagar.

TUESDAY

Shivaji Road, Old Bamboo Bazar, Old Koracharapalaya, Miller Tank, Thimmaiah Road, and Slaughter house Road.

WEDNESDAY

Shivaji Road, Poura Karmikar Lane, Shivaji Nagar, Tasker Town and Chandi Chawk Road.

THURSDAY

Annaiyappa Block, Kumarapark West, Vasantha Nagar and Miller Tank slum.

FRIDAY

University Area, Tasker Town and Payappa Garden.

SATURDAY

S.R. Nagar, Karagappa Garden and Sampangi Ram Nagar.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN SHIVAJI NAGAR RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Shivajinagar — Masjid Road — R.No. 2nd Street (Both side)	600
Shivajinagar — Masjid Road — R.No. 1st Lane	100
Total length	700

TUESDAY – I & III Week

Locality	*Length (m)*
Old Koracharapalya	100
M.No. 1st Street	50
Slaughter house M.No. 4th Street	75
Conservancy Road	300
Total length	525

WEDNESDAY – I & III Week

Locality	*Length (m)*
Old Koracharapalaya 'C' Street	150
Thimmaiah Road — Miller Tank	300
Miller Road	250
Total length	700

THURSDAY – I & III WEEK

Locality	*Length (m)*
Slaughter house Road	200
Slaughter house Road, 'B' Street	150
Shivaji nagar — P.K. Lane 1st Conservancy	100
Shivajinagar — 2nd Conservancy	100
Shivajinagar — 3rd Conservancy	100
Total length	650

FRIDAY – I & III Week

Locality	*Length (m)*
Miller Tank Slum — Side of UNI Office	200
Mohan nagar — East Park Road	200
Sampangiram nagar — 22nd Cross	100
Sampangiram nagar — 23rd Cross	50
Total length	550

SATURDAY – I & III Week

Locality	*Length (m)*
Sampangiram nagar — 1st Cross	600
Sampangiram nagar — 21st Cross	100
Total length	700

MONDAY – II & IV Week

Locality	*Length (m)*
Sambangiram nagar — 5th Main	800

TUESDAY – II & IV Week

Locality	*Length (m)*
Sambangiram nagar — 7th Main	600

WEDNESDAY – II & IV Week

Locality	*Length (m)*
Sampangiram nagar — 5th 'A' Main	300
Sampangiram nagar — 6th Cross (4th Main to 5th Main)	400
Total length	700

THURSDAY – II & IV Week

Locality	*Length (m)*
Sampangiram nagar — 7th Cross (4th Main to 5th Main)	300
Sampangiram nagar — 8th Cross (4th Main to 5th Main)	300
Total length	600

FRIDAY – II & IV Week

Locality	*Length (m)*
Sampangiram nagar — 5th Cross (4th Main to 5th Main)	300
Sampangiram nagar — 8th 'A' Main	300
Total length	600

SATURDAY – II & IV Week

Locality	*Length (m)*
Sampangiram nagar — 15th Main — 1st Cross	400
Sampangiram nagar — 15th Main — 2nd Cross	400
Total length	800

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	250 lit
2.	M.L. Oil	...	...	1,000 lit

Others:

Expanded Polystyrene Beads	...	...	50 kg

Additional Equipments:

Scrappers	...	...	10 Nos.
Spades	...	...	10 Nos.
Bonds	...	...	10 Nos.

TABLE 61

List of drains requiring engineering work

Div. No.	Locality	Type of drain	Length	Breadth	Surface area (m^2)	Solution
68	Thimmaiah Road	Ce U C	500	.5	250	Rep. slab.
68	Jewellery Road	Ce U C	600	.5	300	"
68	Labbay Masjid Street	Ce U UC	400	.5	200	Gradient
71	Kumara park west — 9th Cross	Ce U C	50	1	50	Rep. slabs
"	V.S. Raju Road	Ce U C	300	1	300	"
"	Vasantha Nagar — 8th Main Road	Ce U C	200	.5	100	Sealing of gaps
"	" 2nd Cross	Ce U C	300	.5	150	Rep. slab
"	Kumara park west Seshadripuram Main Road	Ce U C	600	1	600	"
"	Miller Tank slums	Ce U C	300	1	300	Rep. slabs
"	Kumara park East Hare Krishna Rd.	Ce U C	500	1	500	Sealing of gabs
73	Sampangiram Nagar —					
"	29th 'A' Cross, Cross Road	Ce U C	200	.5	100	"
"	1st Cross	Ce U C	800	.5	400	"
"	20th Cross	Ce U C	600	1	600	"
"	8th 'A' Main	Ce U C	300	.5	150	"
"	Mission Road	Ce U C	300	1	300	"
"	Tusker Town — Shivaji Road	Ce U C	300	1	300	"
"	Old cemetry Road	Ce U C	800	.1	80	"
"	Cunningham Road	Ce U C	600	1	600	"

TABLE 62

List of drains requiring yearly cleaning

Div. No.	Locality	Type of drain	Length	Breadth	Surface area (m^2)
68	Thimmaiah Road	Ce/U/C	500	.5	250
70	Jumma Mazid Road	Ce/U/C	300	1	300
”	Nejb Market Road	Ce/U/C	300	1	300
”	Meenakshi Koil Street to P.K. Street	Ce/U/C	600	1	600
”	Chikka Bazaar Road	Ce/U/C	300	1	300
”	B.No. 13F ‘A’ Street	Ce/U/UC	300	.5	150
”	Kuppuswamy Street	Ce/U/C	500	.7	350
71	Kumara park west — Railway Line parallel Road	Ce/U/C	800	.5	400
”	Vasantha Nagar Palace I Cross Road	Ce/U/UC	200	.5	100
”	Palace Road from 2nd Cross to Sankey Rd.	Ce/U/UC	300	.5	150
”	Mohan Nagar — Yumunaba Road	Ce/U/UC	300	.5	150
73	Sampangiram Nagar 1st Main to 16th Cross	Ce/U/C	150	1	150
”	Tusker Town, Pond Road	Ce/U/UC	600	.5	300
”	Thimmaiah Road Cross	Ce/U/UC	600	.5	300

TABLE 63

List of cess pools/vacant plots

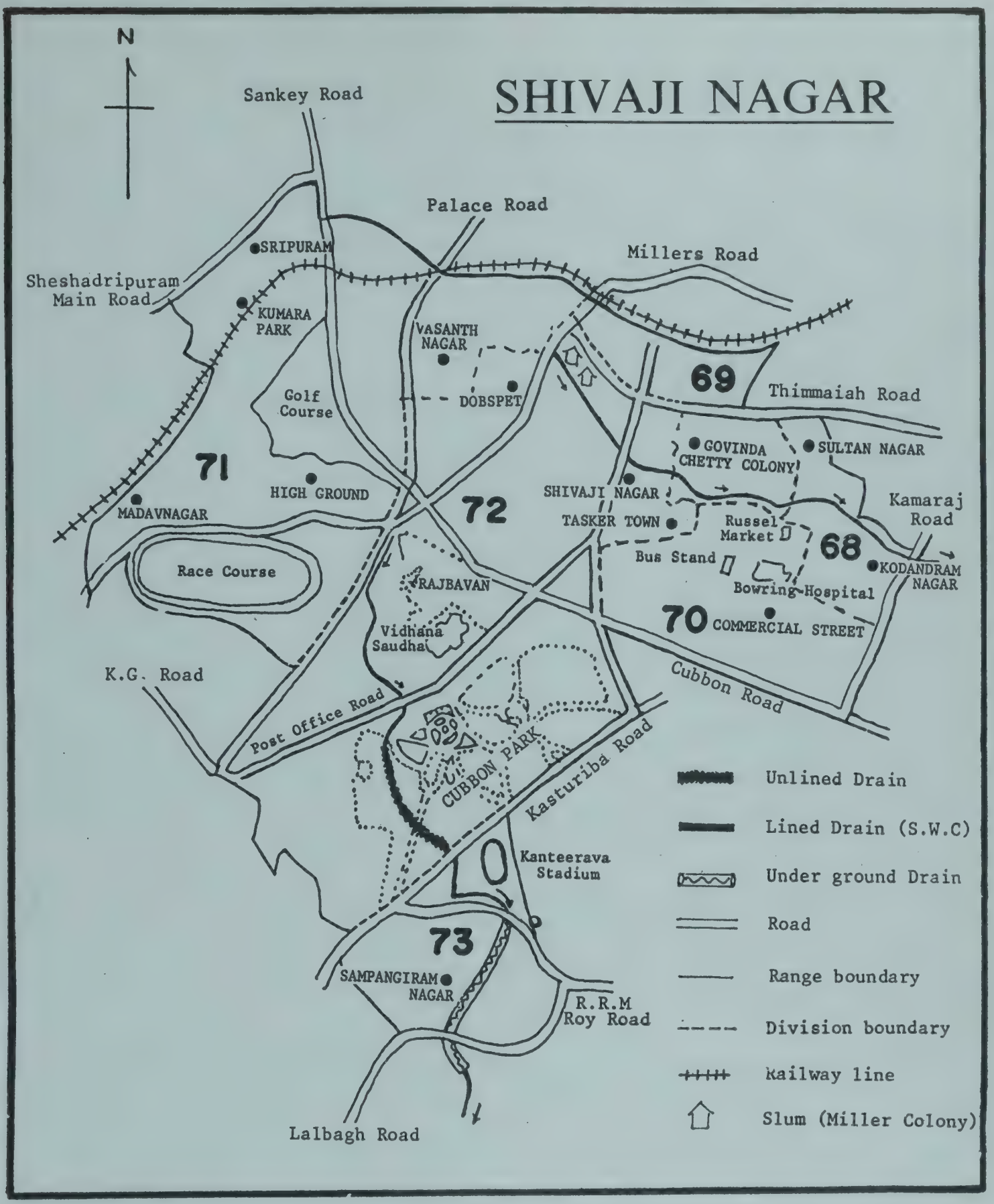
Div. No.	Locality	Type of habitats	Length	Breadth	Surface area (m^2)	Solution
69	Miller Tank area	Pond	50	30	1500	Fish re-leasing
69	Miller Tank area	Cess pool	50	20	1000	”
72	Thimmaiah Road	Cess pool	60	30	1800	Spraying
”	Queens Road left besides Dhabi Ghat	Cess pool	60	40	2400	”

TABLE 64

List of cess pits in Shivaji Nagar

Div. No.	Locality	Length	Breadth	Surface area (m^2)	Solution
71	Miller Tank slums Muniyandi	.5	.5	.25	Spraying
”	” Muniyandi	.5	.5	.25	Spraying
”	” Sheriff	.5	.5	.25	Spraying
”	” Kondaiah	.5	.5	.25	Spraying
”	” Ramu	.5	.5	.25	Spraying
”	” Kodiappa	.5	.5	.25	Spraying
”	” Arumugam	.5	.5	.25	Spraying
”	” Kumarish	.5	.5	.25	Spraying
”	” Kumaraiah	.5	.5	.25	Spraying
”	” Muniyappa	.5	.5	.25	Spraying
”	” Musthan	.5	.5	.25	Spraying
”	” Chinnappa	.5	.5	.25	Spraying
”	” Muniswamy	.5	.5	.25	Spraying
”	” Ellappa	.5	.5	.25	Spraying
”	” Chinniah	.5	.5	.25	Spraying
”	” Muniyandi	.5	.5	.25	Spraying
”	” Munivenkatappa	.5	.5	.25	Spraying
”	” Ponnamma	.5	.5	.25	Spraying
”	” Kollappa	.5	.5	.25	Spraying
”	” Gowramma	.5	.5	.25	Spraying
”	” Velan	.5	.5	.25	Spraying
”	” Narayanappa	.5	.5	.25	Spraying
”	” Sampantha	.5	.5	.25	Spraying
”	” Bheemaiah	.5	.5	.25	Spraying
”	” Peddamma	.5	.5	.25	Spraying
”	” Venkatappa	.5	.5	.25	Spraying
”	” Balamma	.5	.5	.25	Spraying
”	Miller Tank Slum Kumaresh	.5	.5	.25	Spraying
”	” Muthiah	.5	.5	.25	Spraying
”	” Thimmaiah	.5	.5	.25	Spraying
”	” Manibalan	.5	.5	.25	Spraying
”	” Ponnamma	.5	.5	.25	Spraying
”	” Veeraiah	.5	.5	.25	Spraying
”	” Chinnaiahn	.5	.5	.25	Spraying
73	Sampangirama Nagar				
”	” Salam Slum I lane	.5	.5	.25	Spraying
”	” ” II lane	.5	.5	.25	Spraying
”	” ” II lane	.5	.5	.25	Spraying

SHIVAJI NAGAR



3.11 BHARATHI NAGAR RANGE

This range is situated in north-eastern side of the City and covers 9 Sq.km. area. This has a population of 1,69,331. This area is divided into 7 divisions. The important localities included in this range are listed in Table 65.

Breeding Habitats:

Total breeding habitals and their areas in the range are summarized in Table 66.

Some of these breeding habitats are particularly significant from the viewpoint of mosquito production and are elaborated below:

Drains:

Measurements of various drains in all seven divisions of Bharathinagar range were taken. These are given in table 67.

TABLE 65

Divisions and Localities in Bharathi Nagar range.

Division No.	Name of the locality
74	Jeevanahalli, MEG Officer's Colony, Godhandaramapalya, H.C. layout, ITC Colony, Krishnappa Layout, Sanjeevappa layout, Venkatappa layout, Maruthi Sevanagar, Jai Bharathi Nagar, Cookes Town, Cox Town and Balaji layout.
75	Cox Town, Yellappa Garden, Sweepers' Colony, Doddakunte, Thimmaiah Garden, Thomas Colony, Kallahalli, Rangamma Garden and Appajiappa Garden.
76	Nehrupuram
77	Bharathi Nagar
78	Shivannachetty Garden and RBI Quarters.
79	Ulsoor
80	Indira Nagar 1st Stage, Indira Nagar 2nd stage, Binnamangala slums, Murphy Town and Lakshmipura slums.

TABLE 66

Measurements of various breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface Area (Sq.m.)
Storm water canal	9,500	9,500
Cesspits	26	26
Cesspools	4	420
Wells	357	428
Overhead tanks	180	360

TABLE 67

Various types of drains in Bharathi Nagar range

Div. No.	Pukka drains (m)			Kutcha drain (m)	Total length of the drain (m.)
	Covered	Uncovered	L-drain		
74	5,250	49,650	26,550	—	81,450
75	8,700	14,625	22,780	1,000	47,105
76	10,000	4,250	11,800	—	26,050
77	5,500	1,200	6,200	—	12,900
78	22,950	6,000	9,950	—	38,900
79	8,330	11,250	17,200	75	36,855
80	11,500	43,750	6,450	1,610	63,310
Total	72,230	1,30,725	1,00,930	2,685	3,06,570

In Tables 68 and 69, lists of drains requiring engineering work and yearly cleaning are presented.

Tanks:

There are two major tanks in the range, viz. Ulsoor Lake, and Kodarampalya Tank. Both tanks are free from water hyacinth and mosquito breeding is occasional. These tanks are not connected by any sewage drain. A few drains which approach the tank run underground at the end of the tank without mixing with the tank water.

Control:

a. *Storm water canal*:

There are five major storm water canals in the range whose discriptions are detailed below:

a.1. *Jeevanahalli storm water canal (4 Km.)*:

This canal starts from Banasavadi Road and runs through Jeevanahalli, Railway bridge, Madras Engineering Group Military Campus and terminates before Ulsoor lake by getting connected to underground sewerage system. The portion of the the drain between Banasavadi Road, Jeevanahalli and Railway Bridge to a part of the MEG Military Campus is unlined. From MEG Military Campus southwards the drain is in a very good condition and a cunette is present there. The unlined portion of the drain is full of vegetation and silt. Latrine connections are found in the drain in Jeevanahalli area.

Solutions:

1. The unlined drain should be lined and the vegetation and silt should be removed regularly.
2. Latrine connections should be diverted to underground sewerage system.

a.2. *Indira Nagar Main Storm Water Canal (1 km.)*:

This drain starts from Shivajinagar range and runs through K. Kamaraj Road, Ulsoor Lake area, Gurudwara Temple, Laxmanapura Road and Old Madras Road. This is one of the major storm water canals in the city draining sewage from three ranges before finally joining the Bellandur Tank. Before joining with the Bellandur Tank, the canal passes through a part of the walled area in the southwestern sector of the Bangalore airport and this whole part of the canal is unlined.

Solution:

1. The Bangalore City Corporation should make an arrangement with the Airport authorities to line the portion of the canal passing through Airport area. Until completion of the work, the drain can be regularly desilted and sprayed at the rate of 1 ppm of fenthion.

a.3. *Subsidiary drain of Indira nagar Main Storm Water Canal*:

a.3.1. *Indira nagar 2nd stage drain (1.5. Km.)*:

This drain starts from Kadirayanapalya tank outlet canal and runs through Indira nagar 2nd stage, Lakshmipura slum and joins with Indira nagar Main Storm Water Canal. In Lakshmipura slum area heavy garbage dumping and vegetation growth block the free flow of water. Between Indira nagar 2nd stage, IV Main Road and 17th Cross of Indira nagar 2nd stage, the canal has become underground. Since the flow of rain water is maintained in this underground portion of the drain, no mosquito breeding is expected. But the mosquito breeding does occur in the portion of the drain passing through Lakshmipura slum where water flow is choked due to garbage and heavy vegetation growth.

Solution:

1. Regular desilting is required in areas of the canal where garbage and vegetation are plenty e.g. Lakshmipura slum area.

a.4. *Cookes Town drain (2 Km.)*:

This drain starts from Cookes town burial ground and passes through Railway Lines, Mutha Kadurampalya, Wheelers' Road, Cox Town and Gymkhana ground to finally join with Munireddypalya storm water canal in Division 75. This canal is thoroughly lined but still due to public apathy and negligence of the concerned sanitation authorities this drain has been collecting garbage and vegetation at many points.

Solutions:

1. Regular cleaning and desilting are needed.
2. Since the cunette is present, it is desirable that it should be repaired wherever found damaged.

a.5. *Munireddypalya storm water canal (1 Km.)*:

It starts from Jayamahal range and after passing through Wheelers' Road and running parallel to Assey Road it goes underground just near Ulsoor lake. The canal is thoroughly lined and provided with a cunette which is found damaged in some places. The canal does not accumulate garbage, but vegetation is present along the margin at many places.

Solutions:

1. The cunette should be repaired wherever damaged.
2. Deweeding and cleaning should be carried out regularly.

b) *Cesspits and cesspols*:

There are 26 cesspits and four cesspools in this range. As a permanent measure, these habitats should be closed with silt and debris to be collected from the drains under cleaning. However, pending this work, these can be regularly sprayed with fenthion at the optimum dose of 1 ppm (Tables 70 and 71).

c. *Overhead tanks and wells*:

Totally 100 overhead tanks and 357 wells are present in the range but hardly 1.0% of these habitats has been found breeding. Breeding in drinking water wells can be easily prevented by releasing larvivorous fish like *Tilapia* and *Gambusia*. The unused wells can be either closed or breeding in the wells can be prevented by applying EPS at the rate of 500 gm/Sq.m. The problem of mosquito breeding in the overhead tanks should be tackled by permanently covering the overhead tanks with lids leaving no gap at all at the point of sealing.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

Activity	*Staff required*		
	Junior Health Inspector	Headgangmen	Gangmen
1. Spraying	1	—	5
2. Cleaning/Deweeding		—	5
3. Monitoring (Search and Evaluation)	—	6	—

WEEKLY SPRAY SCHEDULE FOR BHARATHI NAGAR RANGE

MONDAY

Jeevanahalli, Madras Engineering Group Officers' Colony, Godhandaramapalaya, ITC Colony, HC Layout, Krishnappa Layout, Sanjeevappa Layout.

TUESDAY

Venkatappa Layout, Maruthi Seva Nagar, Jai Bharathi Nagar, Cookes Town, Cox Town, Balaji Layout.

WEDNESDAY

Yellappa Garden, Sweepers' Colony, Dodakunte, Thimmaiah Garden, Thomas Colony, Kallahalli, Rangamma Garden.

THURSDAY

Appajiappa Garden, Nehrupuram, Bharathi Nagar.

FRIDAY

Shivannachetty Garden, R.B.I. Quarters, Ulsoor.

SATURDAY

Indra Nagar I & II Stage, Binnamangala Slum, Murphy Town, Laxmipuram Slum.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN BHARATHI NAGAR RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Maruthi Sevanagar — Visweswaraiah Road (Jai Bharathi Nagar)	300
Nehrupuram 5th Cross	300
Total length	600

TUESDAY – I & III Week

Locality	*Length (m)*
Nehrupuram — 8th Cross	400
Total length	400

WEDNESDAY – I & III Week

Locality	*Length (m)*
Nehrupuram — 1st Cross	400
Total length	400

THURSDAY – I & III Week

Locality	*Length (m)*
Nehrupuram — 2nd Cross	500
Total length	500

FRIDAY – I & III Week

Locality		*Length (m)*
Nehrupuram — 1st Cross 4th Lane		200
Ulsoor Road		200
	Total length	400

SATURDAY – I & III Week

Locality		*Length (m)*
Indra Nagar I Stage — Binnamangala Slum		210
Murphy Town — Jayaraj Nagar		50
Murphy Town — M.V. Garden I & II Cross		200
	Total length	460

MONDAY – II & IV Week

Locality		*Length (m)*
Murphy Town — M.V.Garden III, IV & V Cross		500
	Total length	500

TUESDAY – II & IV Week

Locality		*Length (m)*
Murphy Town — M.V.Garden VI, VII & VIII Cross		500
	Total length	500

WEDNESDAY – II & IV Week

Locality		*Length (m)*
Murphy Town — M.V.Garden 7th Main		400
	Total length	400

THURSDAY – II & IV Week

Locality		*Length (m)*
Lakshmipura Harijana seva sangha slum		100
Lakshmipura 20th Cross		300
	Total length	400

FRIDAY – II & IV Week

Locality		*Length (m)*
New Andra Block		300
Lakshmipuram 19th Cross		300
	Total length	600

SATURDAY – II & IV Week

Locality		*Length (m)*
Old Madras Road, Kadarampalya Cross Road		300
	Total length	300

INSECTICIDE REQUIREMENT PER ANNUM

Fenthion (82.5% E.C)	...	...	100 litres
M.L. Oil	...	...	400 litres
Others:			
Expanded Polystyrene beads	...	...	25 Kg.
Additional Equipments:			
Scrappers	...	...	5 Nos.
Spade	...	...	5 Nos.
Bonds	...	...	5 Nos.

TABLE 68

List of drains requiring engineering work in Bharathinagar range.

Div. No.	Locality	Type of drain	Length	Width	Surface area (m^2)	Solution
74	Maruthi Sevanagar Banasvadi 'A' cross (From Railway cross)	Ce/U/C	800	1	800	Replacement of slabs
"	Old Poor house Road	"	400	1	400	"
"	Arunachala Mudaliar Road	"	800	1	800	Sealing of gaps
"	Cooks Road 'B'	"	400	.5	200	"
"	Muthyalamma street, Sepping Road	"	800	1	800	"
77	Thimmaiah Road Narayana pillai street	"	1000	1	1000	Replacement of slabs and proper sealing
79	Ulsoor, Ramakrishna Mutt Road	Ce/U/UC	600	.5	300	Replacement of bed slabs
"	" Car street	Ce/U/C	300	.5	150	"
"	" Mutt Road	"	400	.5	200	"
"	" A.No.1st street	"	150	1	150	Sealing of gaps
"	" Bazaar Street	"	350	1	350	"
"	" Lakshmaiah Road	Ce/U/UC	600	.5	300	"
80	Indranagar I Stage	"	500	.5	250	Gradient
"	Lakshmipura slums, I Main	"	1000	1	1000	Replacement of slabs
"	Adarsha Theatre to old Madras Road	Ce/U/C	200	1	200	"
80	Old Madras Road Adarsha theatre Mission hospital Road Laxmipura	Ce/U/C	1000	1	1000	Replacement of slabs & proper sealing
75	Kadirappa road Coxtown sodda Gunta 5th cross road	"	200	1	200	Sealing of gaps
"	Kensinha road (Near Murphy Road)	"	300	1	300	Replacement of slabs
"	Tank Bund Road (From Kenston Road to MBG)	"	500	1	500	Replacement of slabs.

TABLE 69

List of drains requiring yearly cleaning in Bharathinagar range.

Div. No.	Locality	Type of drains	Length	Width	Surface area (m^2)
80	Murphy Town, Famine Road	Ce/U/C	200	.5	100
"	Sadasiva Mudaliar cross Road	Ce/U/UC	150	.5	75
"	Ramachandra Mudaliar Road	Ce/U/UC	200	.5	100
"	Sri Rama Temple Road	Ce/U/C	100	.5	50
"	Jayaraja colony A and B Cross	Ce/U/UC	500	.25	125
"	'F' Cross	"	200	.25	50
"	Lakshmipura slums 16th cross	"	150	.5	75
"	II Stage, Indranagar 17th 'B' Cross Road (House No.607 to 632)	"	200	.5	100
"	17th Cross	"	200	.5	100
"	" "	"	200	.5	100
"	BDA park road	"	400	.5	200
"	3rd 'A' Main Road	"	400	.5	200
"	II Main Road Market Centre	"	250	1	250
"	" "	"	200	.5	100
"	Complex area	"	200	.5	100
75	Cox town, Dodda Gunta	"	500	.5	250
"	Kempanna Garden Road	"	500	.5	250
"	I Main, P.K.S. Quarters Bharathinagar	Ce/U/UC	100	.5	50
74	Krishnappa Layout (MEG Officials colony 2nd Main	"	300	.5	150
"	Banaswadi Road	"	200	.3	60
"	Cookes Town, Hutctuns Road	"	1000	.5	500
"	Cookes Town (From Lenin Road to Miller Rd.)	"	200	.5	100
76	Old Poor house Road	"	400	.5	200
"	Cookes Road 'A'	"	400	.5	200
"	"	"	400	.5	200
78	Ulsoor Road Kensingh Road to D.K. Road	"	1000	.5	500
"	" Haudin Road 'A'	"	600	.5	300
"	" Haudin Road 'B'	"	300	.5	150
"	Dickson Road	"	200	1	200
77	Cosurana street, Thimmaiah Road — John Church Road	"	200	1	200
"	Naala Road to St. John Church Road	"	900	.7	630
79	Ulsoor, Ramakrishna mutt. Road	"	600	.5	300
"	Lakshmaiah Road	"	600	.5	300
75	Kensington Road	"	500	.5	250
"	Rangamma Garden Doddagunta I Main	"	1000	.5	500

TABLE 70

List of cesspits requiring spraying at weekly intervals in Bharathinagar range.

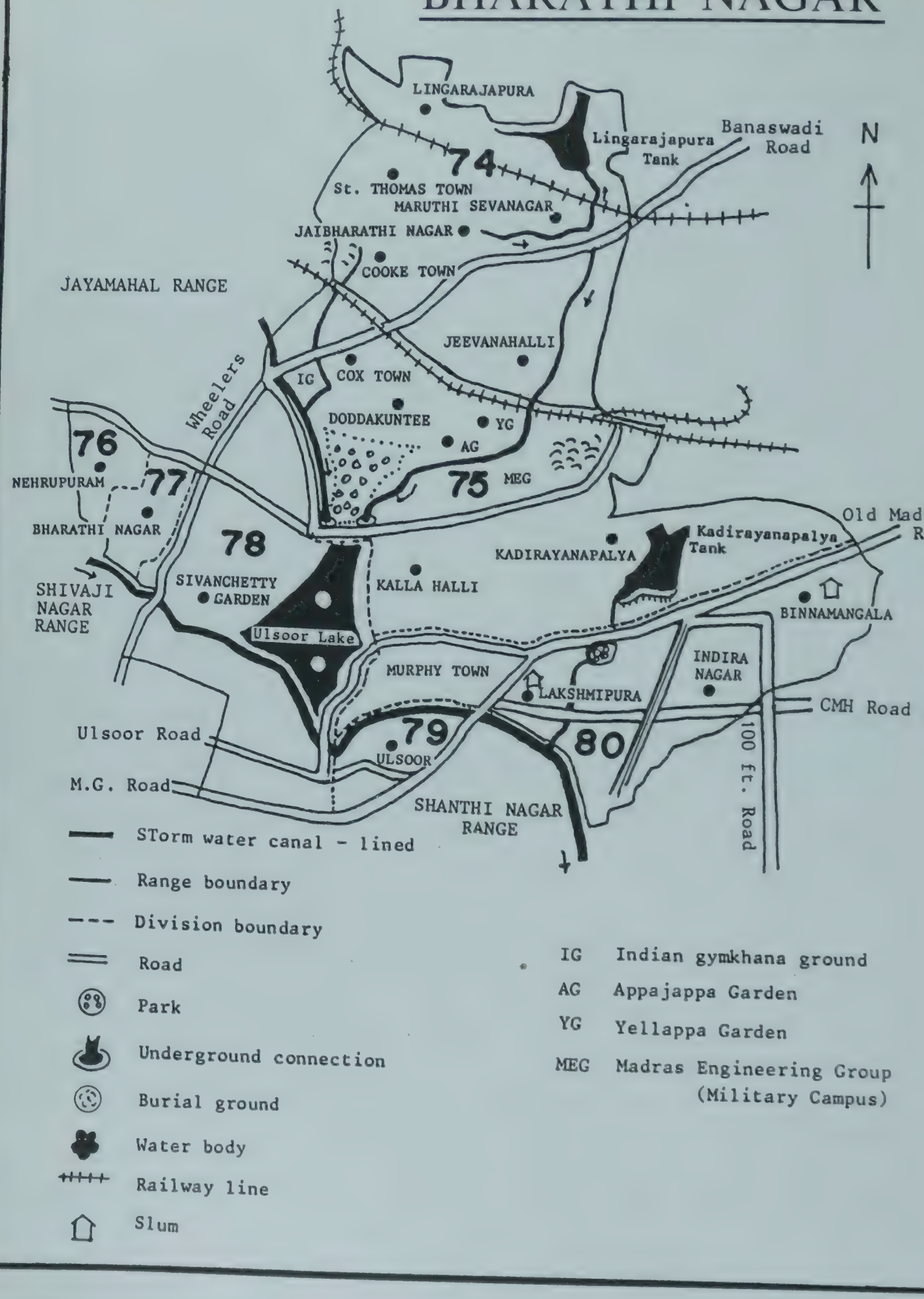
Div. No.	Locality	Length	Breadth	Surface area (m^2)
74	Maruthi sevanagar Near Railway cross Banaswadi Road	2	2	4
79	Begam Mahal (Behind)	1	.5	.5
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
	,,	.5	.5	.25
80	Lakshmipura slums	1	.5	.5
75	Old Madras Road, 7th Lane	3	3	9
,,	Doddagunda, Rangamma Garden 2nd Main	1	1	1

TABLE 71

List of Cesspools requiring regular cleaning/spraying in Bharathinagar.

Div. No.	Locality	Length	Breadth	Surface area (m^2)
79	Begam Mahal	3	3	9
,,	,,	3	3	9
75	Kadrum palya Tank side	30	10	300
	,,	20	5	100

BHARATHI NAGAR



3.12. JAYAMAHAL RANGE

Jayamahal range is situated in the northern side of the city. It has an area of 11 sq.km. and a population of around 2 lakhs. The whole range is divided into seven divisions. Various important localities in all these divisions of the range are given in Table 72.

Breeding Habitats:

Total breeding habitats and their dimensions were measured and summarised in Table 73.

Of all these breeding habitats, drains are more important from the view point of mosquito breeding. These drains were measured and their details are listed in the Table: 74.

TABLE 72

Divisions and Localities in Jayamahal range.

Division No.	Name of the locality
81	Dinnur, Sultanpalya, Aadmananda Colony, R.T.Nagar, Rahamath Nagar, Muni Reddypalya, Matadahalli Adikabir Ashram.
82	Ganganahalli (Ganga Nagar), Ganganahalli Extension, R.T.Nagar, Giddappa Block, Lakshmi Devamma Block, Krishnappa Block, K.H.Munivenkatappa Block, Papanna Block, Lakshmaiah Block, Vasanthappa Block, Sadasiva Nagar, Palace Guttahalli, Jabbar Block, Gangappa Block.
83	Chinnappa Garden, Saradamma Layout, ITI Layout, Benson Town, G.R.Reddy Layout, Nandi Durga Extension, Nandalappa Layout, Munireddypalya (J.C.Nagar), Ramakrishna Block, Marappa Garden, Anjaneyappa Block, Patel Gundappa Block, Jayamahal Extension, Jayamahal.
84	S.K.Garden, S.K.Colony, New Pottery Town, William's Town, Frazer Town, Gandhigramam, Wahab Garden.
85	Hosa Bugalur Layout, Tennary Road, Giddappa Block, Thomas Town, Old Bugalur slum, Swatantra Nagar, Richards Town, Lazzar Layout.
86	Vasantha Block, M.V.Block, (Venkatramapura), P.C.Halli, Kempaiah Block, Vyalikaval.
87	Fraser Town, Wheeler Road, Clever Town, Coles Road, Rains Road.

TABLE 73

Measurements of various breeding habitats.

Type of breeding habitats	Length (m)/No.	Surface area (Sq.mt.)
Storm Water Canal	13,000	13,000
Cesspools	7	245
Cess pits	10	10
Wells	149	779
Overhead Tanks	1,674	3,348

TABLE 74

Various types of drains in Jayamahal range.

Div. No.	Pukka Drains (m)			Kutcha drain (m)	Total length of the drain (m)
	Covered	Uncovered	L-drain		
81	3,700	47,250	21,750	1,600	74,300
82	4,700	77,120	3,700	1,150	86,670
83	5,250	77,920	16,400	630	1,00,200
84	4,400	22,800	12,400	—	39,600
85	1,700	25,530	8,000	—	35,230
86	9,500	10,200	10,200	—	29,900
87	3,050	8,350	3,350	—	14,750
Total	32,300	2,69,170	75,800	3,380	3,80,650

In Tables 75 and 76, lists of drains requiring yearly cleaning and engineering work are presented.

Control:

a. *Storm Water Canals*:

There are three major storm water canals in this range. Their descriptions are elaborated below:

a.1. *Munireddipalya Storm Water Canal (5.0 km.)*:

This canal originates from Munireddipalaya (J. C. Nagar) and after passing through Bommai Gowda Block, Ramakrishna Block, Marappa Block, Anjaneyappa Block, Sheshadri Road area, ITI Layout, S. K. Garden, Gandhi Gramam, Fraser town and Assai Road, it finally runs underground before the Ulsoor lake. This is a partially lined and partially unlined canal. The unlined portions of the canal come in the S. K. Garden and Gandhi Gramam areas which measure about 1.0 km. together. These areas are full of silt and vegetation. The adjacent residences have let their latrine connections directly into the drain, making the drain more mosquitogenic. In the lined portion of the canal where cunette is present, the latter is normally covered with the silt. As a consequence, water spreads and stagnates allowing vegetation to grow and mosquitoes breed and take shelter. The major problem of garbage dumping is in the Gandhi Gramam slum area. In the Fraser Town the man hole chamber is completely broken and water is overflowing to create profuse mosquito breeding.

Solutions:

1. The unlined drain must be lined and the silt and weed must be regularly removed.
2. Till the drain is lined, this should be weekly sprayed with fenthion at the rate of 1.0 ppm dose.
3. The latrine connections in the areas where they are connected with the drain must be separately connected to the underground sewerage system.
4. The manhole chamber in the Fraser Town should be immediately covered.
5. The BCC must make arrangement for placing dust bins in the residential especially slum areas and enforce the relevant law for preventing garbage dumping by local people into the drain.

a.2. *Ganganehalli Storm Water Canal* (3.0 km.):

This canal originates from Ganganehalli Binny Mill area and is lined for the first 100 m. length and again after 2000 m. unlined portion, it is lined for the rest of the length. This canal passes through Binny Mill, Lakshmaiah Block, Laxmidevamma Block, Ganganehalli market, Vasandhappa Block, Ananda Nagar and finally terminates in the Nagavara Tank outside the BCC limit. The un-

lined drain, which is full of silt and weed supports heavy breeding. Latrine connections to the drain from the adjacent residential colonies are plenty.

Solutions:

1. The unlined drain must be lined. Until this work is completed, the whole drain must be regularly cleaned and deweeded.
2. Latrine connections must be diverted to the underground sewerage system.

a.2.1. *Veterinary College subsidiary canal (1.0 km.)*:

This canal starts from the Veterinary College and passes through 10th 'C' Cross, Lakshmaiah Block and finally joins the Ganganahalli main drain near Ananda Nagar. The whole canal is lined without a cunette. The drain is boxed for first 100 m. while the remaining length is irregularly covered, leaving a lot of gaps for mosquito breeding (e.g. M/s. Vishnu Tiles Factory near 10th cross in Ganganehalli). In some places slabs over the closed box drain have fallen into the canal and, consequently, blocked the free flow of water.

Solution:

1. The whole drain should be properly sealed after removing the debris from the drain.

a.2.2. *Hindu Burial Ground subsidiary canal (1.0 Km.)*:

It starts from the Hindu Burial Ground and after passing through K. H. Munivengadappa block, Krishnappa block and Vasanthappa block it joins the Ganganahalli main drain at Vasanthappa block, 4th main road. This drain is unlined between the Hindu Burial ground and K. H. Munivenkadappa block, measuring 300 m., but the remaining length of the drain is lined. The unlined drain is full of silt and the vegetation is found growing along the sides of the drain. Latrine connections from most of these houses are also let directly into the drain.

Solutions:

1. The unlined part of the drain must be lined.
2. The silt and weed must be regularly removed at fortnightly intervals.
3. Latrine connections must be diverted to the underground sewerage system.

a.3. *Matadahalli Drain (3.0 Km.)*:

It starts from Matadahalli and runs through Rahmat Nagar, R.T. Nagar and after traversing through a lot of the peripheral range, finally ends in Nagawara Tank. The drain is found with silt, garbage dumping and thick vegetation which block the water flow at many points. Latrine connections to the drains from nearby residential colonies are also observed which aggravate the mosquitogenic condition.

Solutions:

1. Regular cleaning and desilting work should be carried out.
2. Latrine connections must be diverted to the underground sewerage system.

b) *Cesspits and Cesspools*:

There are ten cesspits and seven cesspools in the range. The best way to get rid of mosquito breeding in these otherwise unmanageable breeding habitats is to fill these with silt and debris collected from the drains under cleaning. However, pending this work, they can be regularly sprayed with fenthion at the optimum dose of 1 ppm. (Tables 77 and 78).

c) *Wells and Overhead tanks*:

Altogether 149 wells and 1,674 overhead tanks exist in the range, but only 1.0% of these has been found breeding. While breeding in the potable wells can be easily prevented by releasing fish such as *Tilapia* and *Gambusia*, that in the unused wells can be prevented by applying the Expanded Polystyrene Beads at the rate of 500 g./ Sq.m. The problem of mosquito breeding in the overhead tanks should be tackled by permanently covering the ranks, leaving no gaps at all at the point of sealing. The BCC must also enforce suitable Public Health Act.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	30
2.	Cleaning/Deweeding	2	—	26
3.	Monitoring (Search and Evaluation)	—	7	—

WEEKLY SPRAY SCHEDULE FOR JAYAMAHAL RANGE

MONDAY

Dinnur. Sultanpalya, Aadmananda Colony, R.T.Nagar, Rahamath Nagar, Muni Reddypalya, Matadahalli Adikabir Ashram.

TUESDAY

Ganganahalli (Ganga Nagar), Ganganahalli Extension, R.T.Nagar, Giddappa Block, Lakshmi Devamma Block, Krishnappa Block, K.H. Munivenkatappa Block, Papanna Block Lakshmaiah Block, Vasanthappa Block, Sadasiva Nagar, Palace Guttahalli, Jabbar Block, Gangappa Block.

WEDNESDAY

Chinnappa Garden, Saradamma Layout, ITI Layout, Benson Town, G.R.Reddy Layout, Nandi Durga Extension, Nandalappa Layout, Munireddypalya (J.C.Nagar, Ramakrishna Block, Marappa Garden, Anjaneyappa Block.

THURSDAY

Patel Gundappa Block, Jayamahal Extension, Jayamahal, S.K.Garden, S.K.Colony, New Pottery Town, William's Town, Frazer Town, Gandhigrama, Wahab Garden, Hosa Bugalur Layout, Tennary Road, Giddappa Block.

FRIDAY

Thomas Town. Old Bugalur slum, Swatantra Nagar, Richards Town, Lazzar Layout.

SATURDAY

Vasanthappa Block, M.V. Block (Venkatramapura), P.C.Halli, Kempaiah Block, Vyalikaval, Fraser Town, Wheeler Road, Clever Town, Coles Road, Rains Road.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN JAYAMAHAL RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Aadmananda Colony: Sultanpalya Main Road	800
R.T. Nagar: 12th Cross	200
" 13th Cross	200
" 14th Cross	150
" 15th Cross	200
" 16th Cross	100
B.J.Hanumanthappa Layout — Dinnur Main Road	1,200
" " I Cross	300
A.K. Colony — II Cross	600
Ramanatha Nagar, Andanappa Block	500
Total length	4,250

TUESDAY – I & III Week

Locality	*Length (m)*
Andanappa Block I to V Cross	1,200
Muneswara Temple Road: 1st Cross	400
" 2nd Cross	400
Ramanatha Nagar — 1st Main	1,000
" 2nd Main	1,000
Total length	4,000

WEDNESDAY – I & III Week

Locality	*Length (m)*
Ramanatha Nagar: 5th Cross	400
" 6th Cross	400
" 4th Main	600
" Conservancy Lane	500
Muddamma garden extension — 4th Cross	400
Matadahalli: 1st Cross	200
" 2nd Main	600
" 4th 'A' Main	300
Adikabir Ashram: 3rd Main	800
Total length	4,200

THURSDAY – I & III Week

Locality	*Length (m)*
Adikabir Ashram: 1st Cross	400
" Conservancy Lane	500
Ganga Nagar Vasanthappa Block: 1st Cross	550
" " 3rd Main	500
" " 4th Main	300
" " 4th Main — 1st Cross	100
" " 4th Main — 2nd Cross	50
Lakshmaiah Block: 1st Cross	100
" 2nd Cross	750
" 4th Lane	200
" 5th Lane	200
Ganga Nagar New Extension: 10th 'A' Cross	100
" 10th 'C' Cross	100
" 10th Cross	200
Total length	4,050

FRIDAY – I & III Week

Locality	*Length (m)*
Lakshmaiah Block: 1st Lane	200
" 2nd Lane	200
" 3rd Lane	200
Ganga Nagar Extension: 8th Cross	200
" 4th and 5th Cross	1,600
Giddappa Block: 1st Cross	600
" 2nd Cross	150
Lakshmi Devamma Block: 3rd Cross	600
" 6th Cross	300
Total length	4,050

SATURDAY – I & III Week

Locality	*Length (m)*
Lakshmi Devamma Block — 7th Cross	400
Krishnappa Block: 6th Cross	400
" 7th Cross	400
" 8th Cross	600

Locality	*Length (m)*
Chinnappa Garden: 1st Cross	400
" 2nd Main	800
" 1st Lane	200
" 2nd Lane	100
" 3rd Lane	200
Chinnappa Garden Slum: 4th Lane	100
" 5th Lane	200
" 6th Lane	200
" 7th Lane	100
Chinnappa Garden Slum back side	260
Total length	4,360

MONDAY – II & IV Week

Locality	*Length (m)*
Chinnappa Garden: 3rd Main	300
" 4th Main	800
" 9th Cross	200
" 10th Cross	500
Sri Ramamandir Block: 1st Cross	600
" 2nd Cross	600
Bommegowda Main Road	1,600
Total length	4,600

TUESDAY – II & IV Week

Locality	*Length (m)*
Bommegowda Main 3rd Cross	600
J.C. Nagar, A.K. Colony — 1st Cross	400
" " 2nd Cross	400
" " 3rd Cross	400
" " 4th Cross	400
" " 5th Cross	400
J.C. Nagar, Ramakrishna Block: 1st Cross	200
" " 2nd Cross	400
Church Road	800
Muthamma Garden: 1st Main	300
Total length	4,300

WEDNESDAY – II & IV Week

Locality	*Length (m)*
J.C. Nagar, Marappa Garden — 2nd to 4th Cross	1,800
Church Road to Seshadri Road	1,000
Anjaneya Block: 1st Cross	600
" 2nd Cross	400
" 4th Cross	500
Total length	4,300

THURSDAY – II & IV Week

Locality	*Length (m)*
Anjaneyappa Road	800
Seshadri Road	800
Anjaneyaswamy Temple Road	800
Church Cross Road	600
Patel Gundappa Block 1st and 2nd Cross	200
J.C. Nagar slum	100
ITI Colony Main Road	1,000
ITI Colony 1st Main 'A' Cross	300
Total length	4,600

FRIDAY – II & IV Week

Locality	*Length (m)*
I.T.I. Colony: 1st Main	400
" 2nd Main	400
" 1st Cross	400
Wahab Garden: 3rd Cross	400
" 2nd Cross	400
" 1st Cross	400
" 1st Main	400
New Pottery Town	200
Bugalur Layout (New) 25th Cross	500
Bugalur Layout (Old) 1st Main	1,000
Total length	4,500

Locality	*Length (m)*
Bugalur Layout — 8th Cross	2,000
" 13th Main to 5th Main Road	1,000
" Main Road	500
Swatantra Nagar Main Road	400
Davis Road (Opp. 6th Cross from B.S.A. Road)	400
Frazer Town: BCC Cattle shed Road	200
Total length	4,500

INSECTICIDES REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	625 Lit.
2.	M.L. Oil	...	...	2500 Lit.

Others:

Expanded polystyrene Beads	...	...	50 Kg.

Additional Equipment:

1.	Scrappers	...	...	20 Nos.
2.	Spades	...	...	15 Nos.
3.	Bonds	...	...	20 Nos.

TABLE 75

List of drains requiring onetime cleaning in Jayamahal Range.

Div. No.	Locality	Type of breeding habitats	Length	Width	Surface area (m^2)
81	R.T.Nagar I Main Thimmaiah Garden	Ce/U/UC	300	1.0	300
"	Sultanpalaya Gramtana 5th Cross	"	300	.5	150
"	A.K. Colony I Cross	"	600	.5	300
82	Ganganagar — K.H.M. Block				
	" In bet.No. V & VI Main	"	300	.75	262.5
"	" In bet.No. VI & VII Main	"	300	.5	150
"	Sadasivanagar — 12th Main	"	600	.5	300
"	" 11th Main	"	600	.5	300
"	" 9th Main	"	700	.5	350
"	" 3rd Main	"	600	.5	300
"	Palace Guttahally Vasanthappa Block near Chinnakrishnappa house	"	600	.5	300
"	Gangadhar Maisthri lane 6th Main	"	300	.5	150
83	Nanda Durga Rd. to Chinnappa Garden slums	"	200	1	200
"	I.T.I Colony Main Road	"	600	.5	300
"	J.C. Nagar — Sornappa Block, I Cross	"	400	.5	200
"	" " II Cross	"	300	.5	150
"	" " III Cross	"	300	.5	150
83	J.C. Nagar Marappa Thota I Cross	"	300	.5	150
"	Conservancy lane	L.D	300	.3	90
"	Conservancy lane	L.D	400	.3	120
"	" III Cross	Ce/U/UC	400	.5	200
"	J.C. Nagar — Munivenkatappa Block II Cross	"	400	.5	200
"	" " IV Cross	"	300	.5	150
84	S.K. Garden, 3rd Main Road	Ce/U/UC	200	.5	100
"	Williams Town, Nehru Road	"	100	1	100
"	New pottery town Main Road	"	250	.5	125
"	From Murugesh Mudaliar Road to Mosque Rd.	"	400	.5	200
"	Elavasaya Road, Frazer Town	"	400	.5	200
85	New Bugalur layout — 21st Cross Road	"	200	.3	60
"	R.V. Colony Main Road (Pillanna Garden)	"	400	.5	200
"	Hosa Bugalur Main Road 3rd Cross Road	L.D	1000	.5	500
"	Tennary Road 13th Cross	Ce/U/UC	400	.5	200
"	12th Cross Sagayapuram (5th Main Road to Sagayapuram)	"	500	.5	250
"	15th Cross, Davis Road	"	200	.5	100
"	5th Main Road (BSA Main)	"	500	.5	250
"	6th Main Road (BSA Main)	"	400	.5	200
"	Thomas Town 9th Cross Road	"	100	.5	50
"	Old Bugalur slum area Main Road	"	2000	.5	1000
"	3rd Cross Road	"	60	.5	30
"	Richard Town (From Davis Road to Viviani Road)	"	600	.5	300

Div. No.	Locality	Type of breeding habitats	Length	Width	Surface area (m^2)
	Giddappa Block I Lane	Ce/U/UC	200	.5	100
"	" II Lane	"	200	.5	100
"	*Sagayapuram* (Giddappa. Block)				
	From BSA Road 19th Cross	"	300	.5	150
"	"	"	600	.5	300
"	"	"	600	.5	300
86	Vaiyalikaval — I Main	"	100	.5	50
"	"	"	100	.3	30
87	Fraser Town — Jermain Road	"	300	.5	150
"	Stephens Road	"	100	.5	50
"	"	L.D	100	.3	30
"	Wheeler Road	Ce/U/UC	500	.5	250
"	Robertson Road	Ce/U/UC	1200	.5	600
"	Alai Road	"	100	.5	500
"	Clever Town (opposite to Fathima T.C.H. Girls High School)	"	500	1.0	500
"	From Thulasi Dass Mutt Road to Frazer Town board	"	100	.5	50
"	Mosque Road both side	"	1000	.5	500
"	Clevand Road	"	200	1.0	200
"	Clevand Road to Stephen Road	"	100	.5	50
"	Coles Road	"	400	.5	200

Table 76

List of drains requiring engineering work in Jayamahal range

Div. No.	Locality	Type of drains	Length	Width	Surface area (m^2)	Solution
82	Ganganagar, Vasanthappa Block IV Cross	Ce/U/UC	400	.5	200	Regrading
"	Papanna Block I Main	"	600	.5	300	"
"	Ganganagar New Extension 10th 'B' Cross	"	400	.5	200	"
"	Lakshmaiah Block — II Main	"	300	.5	150	Replacement of slabs
"	" II Main	"	300	.5	150	Relining
"	" IV Main	"	800	.5	400	Regrading
"	Lakshmaiah Block — I Main	"	300	.5	150	Proper sealing of slabs
"	Ganganagar Extension — I Main	"	400	.5	200	"
"	Lakshmi Devamma Block III Cross	"	600	.5	300	"
"	VI Cross	"	300	.5	150	"
"	VII Cross	"	400	.5	200	"
"	Krishnappa Block — VI Cross	"	200	.5	100	"
83	Pomme Gowda Main Road — J.C.Nagar	"	1600	.5	800	Regrading
"	J.C.Nagar, Marappa Block Maistry Marappa Road	"	400	.5	200	Regrading
"	Jayamahal Extension No.10, Jayamahal Road	"	10	1	10	Replacement of slabs
"	Nandi Durga Extension 18 Chief Engineer Office Miller Road	"	10	.5	5	Replacement of slabs
"	VI Cross Road	"	400	.5	200	Sealing properly
84	New pottery town 3rd cross	Ce/U/C	500	1	500	Replacement of slabs
85	In between 12th and 13th Main (New Bugalur Layout)	"	400	1	400	"
"	Vivani Road	"	400	1	400	"
"	Lazzar Layout Main Road	"	200	.5	100	"
86	Jabbar Block	"	300	1	300	"
"	" Main	"	300	1	300	"
"	P.C.Hally, Ramanamaharishi Marg	"	300	1	300	"
"	Venkatesarangapuram Mosque street parallel	"	200	1	200	Refixing of slabs
"	Kempaiah Block (P.C.hally) 4th Cross	"	200	1	200	"
"	2nd Cross	"	200	.5	100	"
"	2nd Main	"	600	1	600	"
"	Vaiyalikaval I Main	"	200	1	200	"

TABLE 77

List of cesspits requiring regular cleaning/spraying in Jayamahal range.

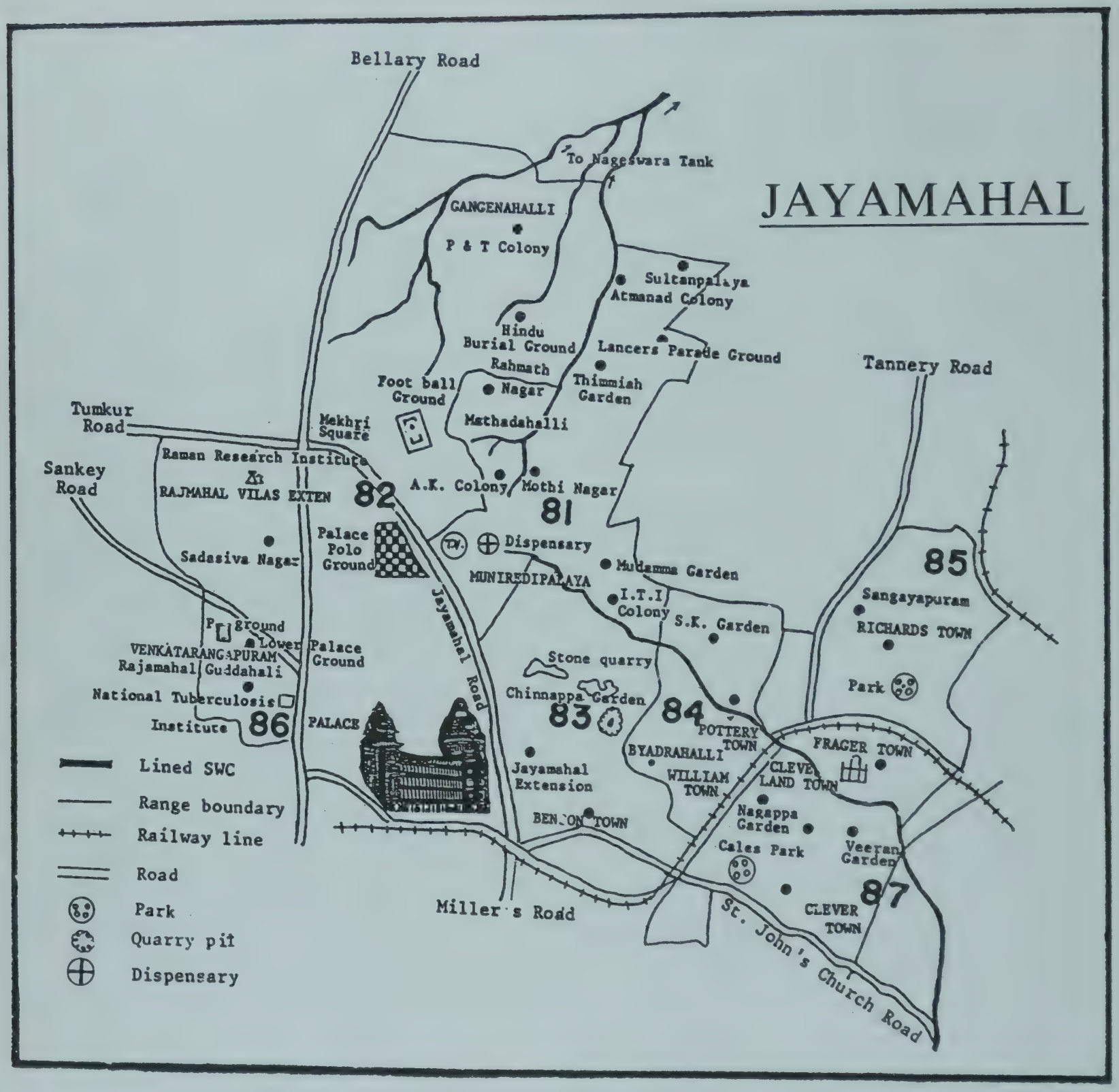
Div. No.	Locality	Length	Width	Surface area (m^2)
83	Chinnappa Garden Slums back side	1	.5	.5
,,	,, ,,	1	.5	.5
,,	,, ,,	1	.5	.5
,,	J.C. Nagar slums	.5	.5	.25
,,	,, ,,	.5	.5	.25
,,	,, ,,	.5	.5	.25
,,	,, ,,	.5	.5	.25
81	Muddamma Garden 5th Cross Road	2	2	4
86	Vasanthappa Block I Cross	1	.5	.5
,,	Lakshmaiah Block, VI Main	1	.5	.5

TABLE 78

List of cesspools requiring regular cleaning/spraying in Jayamahal range.

Div. No.	Locality	Length	Width	Surface area (m^2)
83	Chinnappa Garden slums	5	5	25
,,	,, ,, Back side	5	3	15
,,	Saradamma Layout	10	5	50
,,	Sri Iyyappa School back side	15	2	30
,,	,, ,,	10	5	50
86	Vasanthappa Block I Cross Ganganagar	10	5	50
,,	Lakshmaiah Block VI Main	5	5	25

JAYAMAHAL


Bellary Road
To Nageswara Tank
GANGENAHALLI
P & T Colony
Sultanpalaya
Atmanad Colony
Hindu
Burial Ground
Lancers Parade Ground
Rahmath
Nagar
Thimmiah
Garden
Foot ball
Ground
Mathadahalli
Tumkur
Road
Mekhri
Square
Tannery Road
Sankey
Road
Raman Research Institute
RAJMAHAL VILAS EXTEN
82
A.K. Colony
Mothi Nagar
81
Palace
Polo
Ground
Dispensary
Sadasiva Nagar
Mudamma Garden
MUNIREDIPALAYA
I.T.I
Colony
S.K. Garden
85
Sangayapuram
RICHARDS TOWN
P
ground
Lower Palace
Ground
VENKATARANGAPURAM
Rajamahal Guddahali
Stone quarry
Park
National Tuberculosis
Institute
86
PALACE
Jayamahal Road
Chinnappa Garden
83
84
POTTERY
TOWN
FRAGER TOWN
BYADRAHALLI
Jayamahal
Extension
WILLIAM
TOWN
CLEVE
LAND TOWN
BENSON TOWN
Nagappa
Garden
Cales Park
Veeran
Garden
87
CLEVER
TOWN
Miller's Road
St. John's Church Road
Lined SWC
Range boundary
Railway line
Road
Park
Quarry pit
Dispensary

3.13. NAGAVARA RANGE

This range is situated in the northern side of the city and is bounded by Bellary Road on west and Hennur Road on east respectively. It has an area of about 29 sq.km. Totally 42 villages have been surveyed in the range and they are given below:

Hennur, Maruthi Extension, Geddalahalli, Hennur Bande, Kothanur, St. Thomas Town, Kodugondanahalli, Nagavara, Thanisandra, Vidyasagara, Jakkur, Jakkur layout, Mastri palaya, Govindapura, Dasarahalli, Veerana-palaya, Thanisandra Extension, Kamaraja-nagar, K. Narayanapura, Basavalingappa Nagar, Kaval Byrasandra, Doddana Nagar, Devara Jeevannahalli, Dinnur, Chamundi nagar, Cholanayakanahalli, Vishwanthnage-nahalli, Ashok Nagar, Amruthahalli, Ananda-nagar, Agriculture University Campus, Gud-dadahalli, Subramanaya Colony, Railway Cross Road, Hebbal, Periyar Nagar Colony, Muni Narayanapalaya, Venkateshwarapura, Rachenahalli, Dodda Byrathi, Kemepapura and Maranapalaya.

Breeding Habitats:

Various types of breeding habitats are found in this range. They were surveyed and measured. A summary of the measurements of these habitats is given in Table 79.

TABLE 79

Measurements of different breeding habitats.

Type of breeding habitat	Length (m)/No.	Surface area (m^2)
Cesspits	95	95
Cesspools	83	83,876
Quarry pits	19	9,656
Tanks	6	16,70,000
Wells	104	104
Agriculture wet fields	—	1,50,00,000
Drains:	44,320	22,160
U-drain	24,780	
L-drain	10,260	
K-drain	9,280	

Control:

a. *Tanks*:

There are altogether six tanks, namely, Jakkur (40 ha), Rachenahalli (22 ha), Nagavara (44 ha), Hennur (26 ha), Kacheranahalli (23 ha) and Kadukondanahalli (12 ha). Most of these tanks have fishes and are almost free from pollution. Mosquito breeding is scarcely found in any of these tanks. However, due to rapid expansion of residential colonies in the range, care must be taken not to allow the domestic sewage and sullage into the tanks in future. The BDA and BWSSB should, therefore, plan in advance the structure of layouts for proper disposal of domestic sullage and waste water to prevent mosquito breeding.

b. *Drains*:

Drains in the range include U-, L- and K-drains. Most of the U-drains are filled with silt and are almost at the level of the ground. In Tables 80 and 81, lists of drains requiring engineering work and yearly cleaning are presented. Mosquito breeding occurs in the stagnated water bodies in

the drain. The biggest problem is created by the K-drains which are often full of vegetation. The channelization is also generally improper in these drains.

Solutions:

1. U-drains should be regularly cleaned and deweeded.
2. K-drains should also be deweeded and rechannelized. However, till this work is completed, the drain should be regularly sprayed with fenthion at the recommended dose of 1 ppm.

c. *Cesspits and Cesspools*:

There are 95 cesspits and 83 cesspools in the range. Mosquito breeding is perpetual in these sites. These sites must be filled up as a permanent control measure. However, spraying with fenthion at weekly intervals should be regularly carried out in cesspits only until these are filled up. Also the concerned departments, like BDA, BWSSB and PWD should urgently provide an underground sewerage system to obliterate cesspits and cesspools in this range (Tables 82 and 83).

d. *Wells*:

There are 104 wells in the range and most of them are in use. Mosquito breeding is however observed in the unused wells. It can be controlled by either releasing fish such as *Tilapia* and *Gambusia* or by applying expanded polystyrene beads at the rate of 500 g/m^2.

e. *Quarrypits*:

There are 19 quarrypits in the range. Most of them are having shallow water with heavy vegetation. Mosquitoes have been found to breed in these sites. The quarry pits should be filled up with silt and garbage collected from the drains under cleaning. (Table 84)

f. *Agricultural wet lands*:

Extensive agricultural fields are present in the range. These are irrigated mainly from tanks and tube wells. Mosquito breeding is generally scanty and can be controlled by proper water management so as to avoid pool formation.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	6
2.	Cleaning/Deweeding		—	11
3.	Monitoring (Search and Evaluation)	—	11	—

SPRAYING SCHEDULE FOR NAGAVARA RANGE

MONDAY

Hennur, Maruthi Extension, Geddalahalli, Hennur Bande, Kothanur, St.Thomas Town, Kadugyndanahalli, Nagavara and Thanisandra.

TUESDAY

Vidyasagara, Jakkur, Jakkur layout, Govindapura, Dasarahalli, Veeranapalaya, Thanisandara Extension, Kamaraja Nagar and Mastripalaya.

WEDNESDAY

K. Narayanapura, Basavalingappanagar, Kaval Byrasandra, Doddananagar, Devara Jeevannahalli, Dinnur and Chamundinagar.

THURSDAY

Cholanayakanahalli, Vishwanathnagenahalli, Ashoka Nagar, Amruthahalli, Anandanagar and Agriculture University Campus.

FRIDAY

Guddadahalli, Subramanaya Colony, Railway Cross Road, Hebbal, Periyar Nagar Colony and Muninarayanapalaya.

SATURDAY

Venkateshwarapura, Rachenahalli, Dodda Byrathi, Kempapura, Maranapalaya.

SCHEDULE FOR CLEANING AND DESILTING IN NAGAVARA RANGE

MONDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Devara Jeevanahalli Main Road	625
2.	Ayothidas Nagar	300
3.	D.G. Halli North East Big drain	100
4.	Post Office Main Road	300
5.	Doddanna Nagar — E. Block	300
6.	Doddanna Nagar — 1st Block	100
7.	Doddanna Nagar — 2nd Block	100
	Total length	1,825

TUESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Doddanna Nagar — 4th Block	200
2.	Lala Provision Stores IV Street	200
3.	Fifth Cross Road, Nawaz Industrial Corporation	200
4.	Sixth Cross Road	200
5.	Modi Nagar — 3rd Main Road	200
6.	Opposite of Sampangi Block	150
7.	Ambedkar Nagar, Sampangi Ramiah Block — Vadivel Road	250
8.	Modi Street 2nd Main	400
	Total length	1,800

WEDNESDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	D.G. Halli, Rangappa Block	200
2.	D.G. Halli, K. Bhavani Building Printing House line	150
3.	D.G. Halli Srinivasanagar Panchayat, Nawaz Industrial	1,300
	Total length	1,650

THURSDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	D.G. Halli, in front of Ambedkar School	100
2.	D.G. Halli Main Road (1st Main and 2nd Main)	1,750
3.	Doddannanagar Main Road — Cross Road	100
	Total length	1,950

FRIDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Doddannanagar Main Road	100
2.	Doddannanagar Machine Compound	50
3.	Doddannanagar Colony	200
4.	Amavase Lane	100
5.	Kaval Byrasandra Adventist Tamil Church	100
6.	Kamaraja Nagar towards N.P.Factory	200
7.	Kaval Byrasandra — Main Road (Right side)	800
	Total length	1,550

SATURDAY – I & III Week

Sl.No.	*Locality*	*Length (m)*
1.	Kaval Byrasandra — Main Road (Left side)	800
2.	Dinnur — 4th Cross	100
3.	Dinnur — 2nd Main Road	30
4.	Viswanathnagenahalli — Hebbal East — Main Road	200
5.	Guddadahalli Main Road Subramanya Nagar	200
6.	Guddadahalli village	110
7.	Hebbal — Railway line Road	150
8.	Nagavara — 10th Cross	300
9.	Nagavara — 11th Cross	200
10.	Nagavara — 12th Cross	300
	Total length	2,390

MONDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Nagavara — 13th Cross	400
2.	Srinivasa Road — Nagavara	600
3.	Nagavara — 5th Main	600
4.	Nagavara — 6th Main	200
	Total length	1,800

TUESDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Nagavara — 8th lane	200
2.	Nagavara — 9th lane	200
3.	Nagavara — 1st Main	800
4.	Nagavara — 1st lane	200
5.	Nagavara — 2nd lane	300
	Total length	1,700

WEDNESDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Nagavara — 3rd lane	300
2.	Nagavara — 4th lane	400
3.	Nagavara — 5th lane	400
4.	Nagavara — 2nd Main Road	400
5.	Nagavara — 3rd Main Road	600
	Total length	2,100

THURSDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Nagavara — Mariamman Temple Road	200
2.	Thanisandra — Panchayat hall Road and Narayanapura Road	350
3.	Periyar Nagar, Pillamma garden — Muslim Colony	20
4.	Muninarayanapalaya — 1st Main — near Hotel Rekha	300
5.	Periyar Nagar — 2nd Stage 2nd Cross	200
6.	Venkateswarapura — Ramakrishna Block (near house No.136 Bhooma Devi to 11th Cross)	220
7.	Nagavara Main Road — 1st Cross	200
8.	Nagavara Main Road	200
9.	K. Narayanapura	100
	Total length	1,790

FRIDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Nagavara Main Road	100
2.	Jakkur Bus Stop — Main Road	400
3.	Jakkur — In front of Durga Parameswari Temple	150
4.	Jakkur layout	70
5.	Jakkur — Durga Parameswari Coffee bar	250
6.	Channaiah Gowda lane — Jakkur	70
7.	Jakkur — Nagavara Main Road	500
8.	Jakkur — 3rd Cross	150
	Total length	1,690

SATURDAY – II & IV Week

Sl.No.	*Locality*	*Length (m)*
1.	Jakkur — Nagavara Main Road 7th Cross	300
2.	Kadugondanhalli — Vinobha Nagar	50
3.	Kadugondanahalli — Near Manu Electronics	150
4.	Kadugondanahalli — Harijan and Dhobi Welfare House	75
5.	Kadugondanahalli — in front of Nursery School (Railway gate)	220
6.	Inayath Nagar — Sooa Sab line	200
7.	Hennur village — 2nd lane	200
8.	Kothanur Main Road	130
	Total length	1,325

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	125 lit.
2.	M.L. Oil	...	...	500 lit.

Others:

Expanded Polystyrene Beads	...	...	25 kg.

Additional Equipments:

Scrappers	...	...	10 Nos.
Spades	...	...	10 Nos.
Bonds	...	...	10 Nos.

TABLE 80

List of drains requiring engineering work

Locality	Type of drains	Length	Width	Surface area (m^2)	Suggestions
Devara Jeevanahalli					
Doddanna Nagar — E Block	Ce/U/UC	300	0.3	90	Regrading
Aruced Store Road—Sonnappa Garden	"	100	0.5	50	"
Kaval Byrasandra					
Kunduthoppu — I Street	Ce/U/UC	500	0.5	250	"
II Street	"	300	0.5	150	"
III Street	"	200	0.5	100	"
P and T Quarters					
GI Block to IX Block	Ce/U/UC	1700	0.5	850	"
Ananda Nagar near Desai Poultry Farm	"	15	1.0	15	"

TABLE 81

List of drains requiring yearly cleaning

Locality	Type of drains	Length	Width	Surface area (m^2)
Devara Jeevanahalli				
Manohar clinic cross road	Ce/U/UC	100	0.6	60
Madarasa School	”	100	0.6	60
Sakkar mandi area	”	100	0.6	60
I Main H.K.G.N. Cycle mart	Ce/U/UC	400	0.5	200
Doddannanagar II and III Cross	”	200	0.5	100
Ayothidas Nagar Main Road	”	400	0.6	240
Boating shop lane small	”	200	0.6	120
D.G. Halli				
Attarsan lane Rangappa Block III Cross	”	250	0.6	150
I Cross Rangappa Block	”	100	0.6	60
Maheswaramma Temple Street	”	200	0.6	120
D.G. Halli—Shree Arts Govt. Kerosene Retail Shop				
3rd Cross Modi Road	Ce/U/UC	300	0.5	150
Sewing machine factory	”	200	0.5	100
Doddannanagar Main Road	”	500	0.5	250
Dinnur				
Siddaramanna Block I Main	”	400	0.5	200
Cholanayakanahalli Hebbal East	”	500	0.6	300
Viswanath Nagenahalli Hebbal East	”	100	0.5	50
Ashoka Nagar Main Road	”	200	2.0	400
” Coffee Vilas Left side	”	100	2.0	200
K. Narayanapura	”	100	0.5	50
Jakkur to Yelahanka Road	”	100	0.5	50
Veerannapalaya Main Road	”	200	0.5	100
Nagavara:				
Between III and II Roads	Ce/U/UC	300	0.7	210
Mariamman Temple Road	”	200	0.5	100
Thanisandra				
Gopalasamy Temple Road	”	150	0.3	45
Near Bus Stand	”	50	1.0	50
Vidyasagara School Road	”	200	0.5	100
Visweswara Wet Grinder machine nearby	”	50	0.5	25
Hennur Village	”	400	0.5	200
6th lane	”	600	0.5	300
Hennur Tank Road				

TABLE 82

List of Cesspits requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
D.G. Halli			
Ayothidas Nagar	5	5	25
I Cross Road	5	5	25
Sandhya Nagar			
Pandiyan Cycle Mart	.5	.5	.25
,,	.5	.5	.25
Doddannanagar E-Block	1	1	1
Sampangi Ramaiah Block	1	1	1
,,	1	1	1
Vadivel Road	2	1	2
Near Public Well	3	2	6
Doddannanagar in front of Jambaulla House	2	2	4
Side of Dr. Ambedkar Senior Primary School	1	1	1
,,	1	1	1
Sonnappa Garden Rehmjan Sheriff House	1	.5	.5
Side of Mosque	2	1	2
Kaval Byrasandra			
Suresh Maisthri Lane	2	1.5	3
,,	2	1.5	3
,,	2	2	4
Doddannanagar	2	1.5	3
Amavase Lane	.5	.5	.25
,,	.5	.5	.25
,,	.5	.5	.25
,,	.5	.5	.25
In front of Akbar sab House	1	1	1
Muneeswara Nagar			
Kaval Byrasandra	1	1	1
Sivadas Mahindra House	2	1	2
Near by ,,	1	1	1
,,	1.5	1	1.5
,,	1	1	1
,,	1	1	1
,,	1.5	1	1.5
Motikareem Sab Lane	1.5	1	1.5
House No. 389			
Kaval Byrasandra Near	3	1	3
Public Well	2	2	4

Locality	Length	Width	Surface area (m^2)
Dinnur:			
A, B 2nd Main	1	1	2
2nd Main Road cutting	2	2	4
R.C.C. starting	2	2	4
Chamundinagar, Avalappa Block, Nellamma town	2	.5	1
C. Venkatesh house	1	1	1
Opposite of Venkatesh House	1	1	1
Door No. 207	1.5	1.5	2.25
Door No. 207	1	1	1
Door No. 786	1.5	1.5	2.25
Side of Above	2	2	4
Opp. 26	2	2	4
Side of above	2	2	4
Opp: to Munisamy House	2	2	4
Viswanatha Nagenahalli	2	1.5	3
Behind the village near Pig Farm	1	1	1
Ananda Nagar, Hebbal	1	1	1
Behind House No. 19	1	1	1
Side of House No. 7	1	1	1
Backside Sanjaikruppa	3	2	6
Periyar Nagar			
6th Cross (6 Nos.)	.5	.5	.25
Muslim Colony Main Road	.5	.5	.25
Salt Mandi Street	.5	.5	.25
(2 Nos)	3	2	6
Venkateswarapura	2	2	4
Side of Sri Rama theatre	1.5	1.5	2.25
,,	1	1	1
,,	1.5	1.5	2.25
Plastic Industries	3	3	9
Viswanathan House	3	1	3
Dodda Byrathi Near Bore well	1	1	1
Marenapalaya Main Road side	2	1	2
,, ,,	2.5	1.5	3.75
Lalbahadur Nagar	1	1	1
K. Narayanapura	1	1	1
Jakkur II Cross	.5	.5	.25
,,	.5	.5	.25
,,	.5	.5	.25
,,	.5	.5	.25
Vidyasagara House No. 20/7	.5	.5	.25
Kadugondanahalli Masjid Mohammed Sab House	1	1	1
Vinobha Nagar House No. 522	1	1	1
Bharat Matha Lay out 4th 'C' Cross	2	2	4

Locality	Length	Width	Surface area (m^2)
Manjunatha Pesticide	3	1	3
S.T. Traders Opposite	10	2	20
Kushal Nagar II Stage			
Venkataram House	2	1	2
Near to above	5	1	5
C.S.A. Entry, front side	5	1	5
Open land	5	1	5
Near J.B. Commercial	2	5	10
Inayat Nagar II Main			
Shahadual Khan	1	1	1
Hennur Village	2	2	4
2nd Lane	2	2	4
Nagappa House	5	5	25
Front of Venkataraj House	1	1	1
Back side of C.H. Cycle shop	1	1	1

TABLE 83

List of cesspools requiring filling work

Locality	Length	Width	Surface area (m^2)
D.G. Halli			
Ayothidasnagar 3rd Cross Road	10	5	50
Doddannanagar 'E' Block	20	8	160
" 4th Block	40	10	400
Abdul Samed, Modi Road	40	30	1200
Ameer Ahmed, No. 1001	20	15	300
Doddannanagar			
Immanuel Illam house road	60	40	2400
Side of Abdul Rasool house	5	5	25
,,	5	5	25
,,	5	5	25
,,	4	4	16
Kodi vacant place	100	100	10000
Srinivasanagar last low lying area	5	3	15
Sandyahunagar			
Main Road	25	5	125
Opposite to Engineering Industries	75	25	1875
Near drinking water well	25	15	375
Balaji Primary School Compound	50	25	1250
Sadaj Nagar Road	25	10	250
Opposite to Karnataka Oil Industries	50	25	1250
Near Coconut garden	50	20	1000
Main Road	10	5	50

Locality	Length	Width	Surface area (m^2)
D.G. Halli			
Sandyahanagar slum	60	30	1800
Opposite to School field	20	10	200
Near coconut garden near big drain	100	25	2500
Kaverinagar	10	10	100
"	30	10	300
House No. 64, Rajamani	40	10	400
Modi Road 'B' Cross	10	6	60
Side of Mosque	10	8	80
Side of Modi lane	20	10	200
D.G. Halli P & T Colony	20	15	300
Doddannanagar, Main Road turning	40	30	1200
In front of Iruchappa House	60	40	2400
"	60	40	2400
In front of Murugan store	30	40	1200
Kaval Byrasandra — Muneeswara Nagar	15	15	225
" side of above	20	15	300
"	30	10	300
"	20	20	400
Kaval Byrasandra — Near Public Well	30	30	900
" Near Bus Stand			
Dinnur			
Fourth Cross, N.J. Abraham	6	4	24
Chamundinagar, Avalappa Block			
Opp: Vellammal House	20	10	200
Opp: Munnasab House	6	3	18
Side of C. Venkatesh house	3	2	6
Opp: House No. 26	10	10	100
Viswanatha Nagenahalli — Near Pig Farm	6	3	18
Ashoka Nagar			
Front of Cinema tent	75	50	3750
Sri Gandhi Co.op Limited	200	150	30000
Anurathahalli Colony House No. 234	5.5	3	16.5
" No. 244	5	2.5	12.5
Sri Vigneswara Temple	10	5	50
No.225	4.5	4	18
No.226	5	3.5	17.5
No.221 & 213	4	2.5	10
Front of House No. 192	10	8.0	80
" No.162	4	3.0	12.0
Opp: Yellamma Temple No.126	2.5	1.5	3.75
" No.124	2.5	2	5
Back side of House No. 23	5	3	15
Inside the Veterinary Building	30	20	600
Front side of Baptism hospital	20	15	300
Near Railway Line — Hebbal Main Road	5	5	25

Locality	Length	Width	Surface area (m^2)
Back side of Kanisha Gas Agency	10	2	20
Periyar Nagar Muslim Colony — 7th Cross	20	10	200
End of Muninarayana palaya	10	2	20
Venkateswarapura			
12th Cross	60	30	1800
”	30	30	900
Side of Sri Rama theatre	15	15	225
”	20	15	300
”	20	15	300
”	15	15	225
Chikka Byrathi	2	2	4
House No. 1 and 2 — Kempapura	9	2.5	22.5
”	7	4	28
Nagavara Main Road			
Railway line side	100	50	5000
Jakkur, II Cross	3	1	3
Ramachandrapura	25	10	250
Nagavara 5th Cross	15	5	75
Thanisandra			
Narayanapura Road side	1.5	1.5	2.25
Kadukondanahalli II Cross, H.No.277	5	5	25
Very near to Railway line	3	3	9
Maheswara Temple Road	25	25	625

TABLE 84

List of quarry pits requiring release of fish/filling work.

Locality	Length	Width	Surface area (m^2)
Kaval Byrasandra			
Ashoka Nagar G.N.Engineering Front Gate	20	20	400
Ashoka Nagar Main Road side	10	5	50
Nearby Balaji Kannada Primary School	30	30	900
Mariyamma Temple backside	30	10	300
Temple Road side	10	1	10
Next to above	3	2	6
Near Coconut tree	3	1	3
Ashoka Nagar			
Syed Mehaboob house left side	5	2	10
Front side	3	1	3
R.Ramesh house (front) Ashoka Nagar	10	5	50
G.N.Engineering 112	15	3	45
Cholanayakanahalli	5	18	90
”	25	10	250
”	2	1.5	3
”	3	2	6

NAGAVARA

—··— Corporation boundary

— — — Peripheral boundary

Roads

Railway line

Tank bund

Water body (Tank)

Breached portion of the Tank

3.14. BANASAVADI RANGE

This range is located in the northern side of the city and bounded by Madras and Hennur roads on the east and west respectively. The area of the range is approximately 29 Sq.km. Thirty villages in this range have been surveyed and also mapped. These villages are:

Vigmapura, Kaudenahalli, Kallu Kore, Subbannapalya, Banasavadi, Krishnappa garden, Dooravaninagar, Ramamoorthynagar, Gurumoorthy Reddy layout, Channasandra, Dorasamypalya, Angenapura, Kasarahalli, Ramaswamypalya, Dr. Kuvempu Road, Munisamiappa Road, Muneeswara Koil Street, Kammannahalli, Byappanahalli, Maruthi Sevanagar, Kacharakanahalli, Kadugondanahalli layout, Kachekeera halli, Lingarajapura, Sanjeevareddy nagar, Dodda Banasavadi, Pappannapalya layout, Subbannapalya, H. Agra Extension and Horamavu.

Breeding Habitats:

Various breeding habitats have been surveyed in the range and these are summarized in the Table 85.

TABLE 85

Measurement of the various breeding habitats in the range.

Sl.No.	Type of breeding habitats	Length (m)/No.	Surface area (m^2)
1.	Cesspits	74	74
2.	Cesspools	20	46,703
3.	Tanks	7	6,70,000
4.	Wells	272	272
5.	Agriculture Wetland	—	1,00,00,000
6.	Quarry pits	4	2,560
7.	Drains	1,26,325	63,163
	(i) Box-drain	2,000	
	(ii) U-drain	78,275	
	(iii) L-drain	14,070	
	(iv) K-drain	31,980	

Control:

a. *Tanks*:

There are overall seven tanks in the range. All these tanks have clear water without much pollution. Therefore, mosquito breeding has not been found. The tank water is regularly used for irrigation.

b. *Drains*:

A total of 1,26,325 m. length of drains exist in the range. These comprise box drains, as well as U-, L- and K-drains. In most part of the box-drains, silt and garbage have blocked the free passage of water. In Tables 86 and 87 lists of drains requiring engineering work and yearly cleaning are presented. In such places, heavy mosquito breeding occurs. The K-drains are not properly channelized and vegetation growth has been found to interfere with the free flow of water.

Solutions:

1. The lined box and open drains should be regularly cleaned.
2. The K-drains must be channelized and weed should be removed from the banks. However, till this work is completed, spraying with fenthion at 1 ppm dose should be carried out on weekly basis.

c. *Cesspits and Cesspools*:

There are altogether 74 cesspits and 20 cesspools in the range which are also found to be the potential breeding grounds for mosquitoes. As a permanent measure, all these should be filled up with silt and garbage removed from the drains under cleaning. However, as this process will take time, these must be regularly sprayed with fenthion at 1 ppm dose (Tables 88 and 89). Also the BWSSB should immediately develop underground sewerage system to dispose of the domestic waste water and sullage.

d. *Wells*:

Altogether 272 wells are present in the range. Most of them are in use and are free from mosquito breeding. Breeding is however noticed in some of the unused wells where it can be prevented by either releasing the fish such as *Gambusia* or *Tilapia* or by the application of expanded polystyrene beads at the rate of 500 g/Sq.m.

e. *Quarry Pits*:

Mosquito breeding is not found to be heavy in these pits at the time of survey but these pits with vegetation growth may form potential breeding grounds for mosquitoes with increase in water pollution due to decay of vegetation. These quarry pits should be essentially filled and levelled up with silt and garbage etc., removed during cleaning work in other parts of the area. However, till the filling is completed, spraying with fenthion along the edges which are positive for mosquito breeding should be carried out (Table 90).

f. *Agricultural Wetlands*:

Since the wetlands receive relatively unpolluted water from tanks, there is no breeding. Yet, agriculturists should be persuaded not to allow water stagnation to form pools for long periods to avoid mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	20
2.	Cleaning/Deweeding	1	—	18
3.	Monitoring (Search and Evaluation)	—	11	—

WEEKLY SPRAY SCHEDULE FOR BANASAVADI RANGE

MONDAY

Vigmapura, Kaudenahalli, Kallu Kore, Subbannapalya, Banasavadi, Krishnappa garden and Dooravaninagar.

TUESDAY

Ramamoorthynagar, Gurumoorthy Reddy layout, Channasandra, Dorasamypalya and Angenapura.

WEDNESDAY

Kasarahalli, Ramaswamypalya, Dr. Kuvempu Road, Munisamiappa Road, Muneeswara Koil Street and Kammannahalli.

THURSDAY

Byapanahalli, Maruthi Sevanagar, Kacharakanahalli, Kadugondanahalli layout and Kachekeera halli.

FRIDAY

Lingarajapura, Sanjeevareddy nagar, Dodda Banasavadi and Pappannapalya layout.

SATURDAY

Subbannapalya, H. Agra Extension and Horamavu.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN BANASAVADI RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Ramamoorthy nagar — 4th cross	400
Ramamoorthy nagar — 5th cross	400
Ramamoorthy nagar — 6th cross	500
Ramamoorthy nagar — 7th cross	500
Ramamoorthy nagar — 8th cross	350
Ramamoorthy nagar — 9th cross	400
Ramamoorthy nagar — 10th cross	400
Total length	2,950

TUESDAY – I & III Week

Locality	*Length (m)*
Ramamoorthy nagar — 2nd 'A' cross	500
Ramamoorthy nagar — 3rd 'A' cross	550
Ramamoorthy nagar — 5th 'A' cross	600
Ramamoorthy nagar — 8th Main Road — 1st lane	100
Ramamoorthy nagar — 2nd lane	100
Ramamoorthy nagar — slums — 9th lane	150
Ramamoorthy nagar — slums — Main Road	75
Ramamoorthy nagar — slums — 1st lane	75
Ramamoorthy nagar — Main Road	800
Total length	2,950

WEDNESDAY – I & III Week

Locality	*Length (m)*
Ramamoorthy nagar — Main Road	200
Ramamoorthy naga— 1st Cross	250
Ramamoorthy nagar — 2nd Cross	600
Ramamoorthy nagar — 3rd Cross	500
Ramamoorthy nagar — 4th Cross	200
Conservancy	100
Ganesha Temple Road 2nd Cross	200
Ramamoorthy nagar — 6th Cross	400
Ramamoorthy nagar — 1st lane	100
Ramamoorthy nagar — 4th lane	100
Total length	2,650

THURSDAY – I & III Week

Locality	*Length (m)*
Gurumurthy Reddy layout	300
Gurumurthy Reddy layout Main Road	300
Ramamoorthy nagar — 1st Main Bovi Colony	700
2nd Main Kowdanahally	400
Hally Road	400
3rd Main Anthery school road	600
Total length	2,700

FRIDAY – I & III Week

Locality	*Length (m)*
3rd Main Road Anthery School Road	200
4th Main Road	500
5th Main Road	400
8th Main Road — lane	100
4th lane	100
5th Main — 1st lane	120
6th Main Road	600
7th Main Road	600
Total length	2,620

SATURDAY – I & III Week

Locality	*Length (m)*
Ramamoorthy nagar: 8th Main Road	600
" 1st Cross	400
" 2nd Cross	400
" 3rd Cross	400
Kaudenahally Main Street	100
Vignapura slum 1st lane to 6th lane	325
Vizanapura (Kothur) 7th Cross	300
" 8th Cross	300
Total length	2,825

MONDAY – II & IV Week

Locality	*Length (m)*
Vizanapura — 8th Cross	300
" 9th Cross	600
" 10th Cross	500
" 11th Cross	600
Ambedkar Colony	75
Total length	2,075

TUESDAY – II & IV Week

Locality	*Length (m)*
Kothur — 1st Main Road	1,000
Kothur — 2nd Main Road	800
Kothur — 3rd Cross	500
Kothur — 3rd Main Road right side	500
Total length	2,800

WEDNESDAY – II & IV Week

Locality	*Length (m)*
Kothur — 3rd Main Road left side	500
Kothur — 4th Main Road	1,000
Kothur — 5th Main Road	700
Jothipuram Slum	165
Dargah Mohalla — 3rd Cross	200
Total length	2,565

THURSDAY – II & IV Week

Locality	*Length (m)*
Ramamoorthynagar — 4th Cross	600
Ramamoorthynagar — 5th Cross	400
Ramamoorthynagar — 6th Cross	100
Dorasamipalya — Bassappa Garden	100
Nearby Banneerghatta road	100
Kasarahalli, Mamikaray, House No.72	50
Dr. Kuvempu Road — Ramaswamy Palya	30
Munisamppa Road	200
3rd Cross	200
4th Cross	225
Kamanahally Main Road	200
Ramasamypalya — Chikkana Nilaya (Gopal house)	100
Mariammana Koil Street	300
Santosh Illam	100
Total length	2,705

FRIDAY – II & IV Week

Locality	*Length (m)*
Kammanahalli Main Road	200
Kammanahalli — Side of House No.46	20
Kammanahalli — Side of Dinesh Electrical	50
Kammanahalli — Side of House No.22	40
Byyappanahalli — Kumaraswamy Road	50
Kacharakanahalli —	20
Lingarajapuram to Kacharakanahalli Tank	1,000
5th Cross — Lingarajapura	300
Karamchand layout — 15th Cross — Lingarajapuram	400
Kariyannapalaya — Lingarajapura	100
Sri Chamundeeswari Temple Road — Lingarajapura	200
15th Cross Road — Lingarajapura	200
16th Cross — House No.588 — Lingarajapura	50
Balaji flour mill road — Lingarajapura	150
Total length	2,780

Locality	*Length (m)*
Pack — O — Products Ltd. Road, Lingarajapura	200
Lingarajapura — Arrack shop Road	200
Banasavadi — Kammanahalli Extension — in front of Cardboard boxes & printers Ltd.	60
Banasavadi — Kammanahalli Extension	100
" — Kammanahalli Extension (DEH) No.191	30
" — Dodda Banasavadi Road	125
" — Main Road	200
Horamavu — Mill Road	280
" — Main Road	200
" — Main Road	150
" — 2nd Main Road	400
" — 4th lane	200
" — Cross Road	300
" — 6th Lane	100
" — 7th Lane	200
Total length	2,745

INSECTICIDE REQUIREMENT (Per Annum):

Fenthion (82.5% E.C)	...	...	400 lit.
M.L. Oil	...	...	1,600 lit.

Others:

Expanded polystyrene beads	...	...	25 Kg.

Equipment Required:

1.	Scrappers	...	...	15
2.	Spades	...	...	10
3.	Bonds	...	...	10

TABLE 86

List of drains requiring engineering work.

Locality	Type of drain	Length	Width	Surface area (m^2)	Suggestion
Dooravaninagar:					
IIT Quarters North 5th Lane	Ce/U/UC	200	0.5	100	Replacement of slabs.

TABLE 87

List of drains requiring yearly cleaning.

Locality	Type of drains	Length	Width	Surface area (m^2)
Subbanapalaya	Ce/U/UC	15	0.5	7.5
Right side of Main Lingarajapura	”	200	1.0	200
No. 4/13	”	50	0.6	30
Cresent School Joseph Reddy Layout	”	200	0.6	120
2/22 Lokesh Road	”	100	0.6	60
2/66 Girijasamy Extension	”	50	0.6	30
V Cross	”	600	0.5	300
Papannapalya layout	”	640	0.5	320
”	LD	160	0.5	80

Table 88

List of cesspools requiring filling work.

Locality	Length	Width	Surface area (m^2)
Kaudenahally Near Govt. Bore	30	50	1,500
Side of Doddamma Temple	50	40	2,000
II Bore pump	60	40	2,400
Dooravaninagar			
I Cross, I Lane	7	7	49
” II Lane	10	10	100
” IV Lane	10	8	80
Near Railway line	5	5	25
Chanasandra III Cross	30	15	450
Ramasamypalya front of Gloves Factory	6	8	48
Ramaswamypalya V Cross, House No.98 (Opp.)	50	50	2,500
Kalamma Road End	50	500	25,000
Handicraft Welfare Association	20	10	200
No.33, III Cross	50	10	500
Main Road III Cross	50	10	500
Lingarajapuram			
II Cross Road End	5	3	15
Banasavadi area Kammanahally Extension	80	60	4,800
Entrance Five plots	80	80	6,400
Banasavadi area			
Kacharakanahally Paddy field	25	4	100
Anjaneyasamy Temple	2	3	6
Near Main Road No. 122	6	5	30

TABLE 89

List of cesspits requiring regular spraying till the completion of the filling work.

Locality	Length	Width	Surface area (m^2)
Vignapura slums	2	1	2
,,	1	1	1
,,	1	1	1
Dooravaninagar VI Cross road rightside	2	1	2
Jognripuram slums	2	2	4
	1	1	1
	1.5	1.5	2.25
Channasandra Near Bore well, Kasthurinagar	1	1	1
I Cross end	1	1	1
Dorasamypalya Nearby Banneeraghatta Road	3	2	6
Ramasamypalya Sultan house	1	1.5	1.5
Basheer Ahmed	2.3	3.0	6.9
Ramaswamypalya Near Zakkiri house, House No.83	2	1	2
Gopal House	1	1	1
Kammanahally Road	2	2	4
Near House No.27	2	2	4
No. 10/11 opposite	2	2	4
Byyappanahally:			
Front of Indian Oil Bank	2	1.5	3
,,	3	2	6
Opposite to Communicable Diseases hospital	1	0.7	0.7
Side of Railway line Avar Patel Industries	1	0.6	0.6
Banasavadi:			
Maruthisevanagar in front of G.B. Sastri house	5	2	10
Kandaiah house	2	1	2
Subbanapalaya	5	2	10
Near village side Kacharakanahally	5	2	10
Side of tank bund	5	1	5
,,	5	1	5
,,	5	1	5
Kadugondanahally Layout opp. of house No.22	1.5	1.5	2.25
Vinobhanagar in front of 569	1	1	1
,,	1	1	1
Near Railway gate line	1	1	1
Kachakerahally, 51, Zaruddin	1	1	1
,, 66, Ramanna	1.5	1.5	2.25
,, 153, Bazeer	1	1	1
,, 155, Ahmed	1	1	1
,, 156 ,,	1	1	1
,, 905, O. Nazeer	2	1	2
,, 570,	1	1	1
,, 568,	1	1	1
,, 62/1,	1.5	1	1.5

Locality	Length	Width	Surface area (m^2)
Lingarajapuram:			
Site No.1308	3	1	3
Opp. Munisamy house	1	1	1
197	2	1	2
Oil Mill Road No.153	1	1	1
Kalpana Nilaya	2	0.5	1
,,	2	0.5	1
,,	2	3	6
Oil Mill Road	2	1	2
Sait palya mosque No.36	2	1.5	3
122/1, Hennur Main Road	1	1	1
V Cross	1	1	1
II Cross	1	1	1
New BDA Extension No. 5/120	2	2	4
Post Office Lane	1	1	1
Kammanahally — Behind No.124	1	1.5	1.5
Dodda Banasavadi — No.578 Maruthi Bar opp.	10	1	10
No.2, Subramani Road side	2	2	4
,,	5	1	5
Pappannapalya Layout	2	2	4
Banasavadi	5	4	20
,,	3	2	6
,,	2	3	6
,,	4	3	12
,,	2	2	4
,,	2	2	4
,,	1	1	1
Banasvadi, Padma Sanjeev Reddy Lane	1	0.5	0.5
P.V.N. Nambiyar	1	0.5	0.5
S. Shadasiva	1	0.5	0.5
P. Raachandrappa	1	1	1
Agra Main Road	5	5	25
Horamavu III Main Road	1	0.5	0.5

TABLE 90

List of Quarry pits requiring filling

Locality	Length	Width	Surface area (m^2)
Chanasandra Ganesha Temple Road	40	12	480
III Cross	40	15	600
Ramasamypalya	40	35	1,400
,,	10	8	80

BANASAVADI

Hennur Road
Banasavadi Road
Old Madras Road
AGARA
Agara Tank
Chalkere Tank
CHALKERE
KALKERE
KAMMANHALLI
HOREMAVU
KAUDANAHALLI
Horemavu Tank
BANASVADI
RAMAMURTHI NAGAR
VIJINAPURA
CHANNASANDRA
KOTTURU
Nagannapalya Tank
VIMANPURA
Dooravaninagar Tank
BYAPPANAHALLI
Byappanhalli Tank
Corporation boundary
Peripheral boundary
Road
Railway line
Tank bund
Water body (Tank)
Breached portion of the Tank
Brick kiln

3.15. BYRASANDARA RANGE

This range is situated in the eastern side of the city and is bounded on north and south by Madras and Varthur roads repsectively. The range covers an area of about 30 Sq.km. Various villages have been surveyed in the range and are listed below:

Mahadevapura, B. Narayanapura, Nagavarapalaya, Murugesapalaya, Konenda Agrahara, Hale Thippesandara, Hossa Thippesandara, Jeevana Bheemanagar, Hanumannagar, Anandapur, Kodihalli, Sreenivasapura, Byrasandra, Suddakuntapalaya and Vibhuthipura.

Breeding Habitats:

A number of breeding habitats were located. They have been measured and their mosquitogenic potential has been determined. They are given in the table 91.

TABLE 91

Measurements of various breeding habitats in the range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspit	21	21
2.	Cesspool	32	15,500
3.	Wells	32	32
4.	Quarrypits	2	45,250
5.	Agriculture fields	—	70,00,000
6.	Drains	34,304	17,152
	U-drains	13,405	
	L-drains	4,990	
	K-drains	15,909	
7.	Tanks	4	7,00,000
8.	Storm water canals	2,000	2,000

Control:

a. *Storm water canals*:

There is only one storm water canal (2 Km.) in the range. This starts from Earth Movers Factory and after passing through New Thippe Sandara and Kodihalli Tank (breached) finally joins the Indra Nagar Canal near HAL Road. The drain has accumulated heavy silt and garbage near the Thippesandara Bazaar street. In places where water is stagnated due to garbage dumping and silt deposition, mosquito breeding is a perpetual problem.

Solution:

The canal should be regularly cleaned and desilted.

b. *Drains*:

The total length of the drains in the range is about 35,000. The U- and L- drains are often covered with silt while the K- drains are not properly channelized. In all these stagnant water bodies, mosquitoes are found to breed.

Solutions:

The U and L-drains should be desilted regularly, while the K-drains should be rechannelized wherever necessary and regularly sprayed with fenthion at 1 ppm dose.

c. *Cesspits and Cesspools*:

There are overall 21 cesspits and 32 cesspools in the range. Both these sites are found to be potential breeding grounds for mosquitoes. The

cesspools should be immediately filled up with the silt and the garbage collected from the drains under cleaning. The cesspits should also be filled up. Till the completion of filling work, these should be cleaned and sprayed with fenthion at the recommended dose of 1 ppm. (Tables 92 and 93). The BWSSB should also provide underground sewerage system in the range for the proper disposal of domestic waste water and sullage to reduce the cesspits which in turn could control mosquito breeding.

d. *Quarry pits*:

These must be filled up. However, fish such as *Gambusia* and *Tilapia* should be released to control mosquito breeding in these pits till the completion of filling work (Table 94).

e. *Wells*:

There are only 32 wells in the range and barring a couple of wells all are in use and have no mosquito breeding. In the few unused wells, mosquito breeding should be controlled either by releasing fish such as *Gambusia* or *Tilapia* or by applying the expanded polystyrene beads at the rate of 500 g/m^2.

f. *Agricultural wetlands*:

There is a vast stretch of about 7 Sq.Km. of the agricultural wetland in the range. Since the tank water used for irrigation in agricultural fields is relatively unpolluted, mosquito breeding is scarcely found. Farmers should, however be educated not to allow any pool formation for longer period to avoid mosquito breeding.

g. *Tanks*:

There are altogether four tanks but none is polluted and therefore no mosquito breeding has been found. Yet, Koddihalli tank which has been recently breached and used for constructing residential colonies should be immediately filled and levelled up to avoid water accumulation in the low-lying bed of the tank. In future, breaching of similar tanks should not be allowed for housing etc. without proper arrangement of underground sewerage system.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	9
2.	Cleaning/Deweeding		—	6
3.	Monitoring (Search and Evaluation)	—	12	—

WEEKLY SPRAY SCHEDULE FOR BYRASANDARA RANGE

MONDAY

Mahadevapura, B. Narayanapura

TUESDAY

Nagavarapalaya, Murugesapalaya, Konenda Agrahara

WEDNESDAY

Hale Thippesandara, Hossa Thippesandara

THURSDAY

Jeevana Bheemanagar, Hanuman Nagar, Anandapur.

FRIDAY

Kodihalli, Sreenivasapura

SATURDAY

Suddakuntapalaya, Vibhutipura, Byrasandara.

SCHEDULE FOR CLEANING AND DEWEEDING OF DRAINS IN BYRASANDARA RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Murugeshapalaya — Konen Agrahara	10
" — Viji Milk Centre, Dharmaraj Building	20
" — Syndicate Bank, No.2/52	15
" — Gabir Building side of Venkateswara Stores	10
" — SABS Nills General Stores	20
" — In front of House No.119	25
" — Ambika Brush ware No.132/4	25
" — In front of House No.108	10
Kodihalli — HAL Main Road right side	55
" — 5th Cross	40
" — 4th Cross	20
" — Opp. Hotel Depura	20
" — Opp. Venkateswara Temple	20
" — Govindappa Lane, 40/10	60
" — Side of Primary School	40
" — 80 feet road	60
" — Opp. House No. 757	10
" — Left side of Chowdeswari Enterprises	25
" — Right side of 1st Main Road	120
Annasandra Palya	115
Annasandra Palya — 1st Main Road No.116	40
Total length	760

TUESDAY – I & III Week

Locality	*Length (m)*
New Thippasandra — Puttappa Colony House No.36	35
" — SLG Engineering	30
" — To Vinayaka Medicals	35
" — Near Bright Cold Storage	20
" — Opp. Sakthi Ganesha Temple	25
" — Opp. Ravichandra Provisions	35
" — Near Shekar Restaurant	25
" — Near G.S. Tailor, No.234	30
" — 2nd Main Radha Stores No.250	25
" — Near Manjunatha Talkies	120
Old Thippasandra — 6th Main to 7th Main	80
" — 13th Main to 80 feet road	240
" — 7th Main to 8th Main	25
" — Naveen Kumar Provisions Stores to Dhobi Shop	30
" — 11th Main 9th Cross No.152 & 151	25
Total length	780

WEDNESDAY – I & III Week

Locality		*Length (m)*
Mahadeva Pura — 1st Cross, 1st Main Road		550
— 2nd Main Road		500
	Total length	1,050

THURSDAY – I & III Week

Locality		*Length (m)*
B. Narayanapura — 1st Cross		500
" 2nd Cross		1,000
	Total length	1,500

FRIDAY – I & III Week

Locality		*Length (m)*
B. Narayanapura — 2nd Main Road		250
" — 4th Main Road		250
" — 5th Main Road		250
	Total length	750

SATURDAY – I & III Week

Locality		*Length (m)*
B. Narayanapura — 5th Main Road		250
" — 2nd Cross		400
	Total length	650

MONDAY – II & IV Week

Locality		*Length (m)*
B. Narayanapura — 6th Cross		300
” — 7th Cross		400
” — ‘B’ Lane		100
	Total length	800

TUESDAY – II & IV Week

Locality		*Length (m)*
B. Narayanapura — Tin Factory back side		250
” — Village		500
	Total length	750

WEDNESDAY – II & IV Week

Locality		*Length (m)*
B. Narayanapura — White Field Road, Main		500
” — White Field Road, 1st Cross		500
	Total length	1,000

THURSDAY – II & IV Week

Locality		*Length (m)*
B. Narayanapura — White Field Road, 1st & 2nd		150
” — Gangadharanagar Main Street		250
Venkateswara Colony —		150
” — Srinivasapura — Suddekunte palya Road		65
” — Poojamma Temple left and right side		145
” — Binnaamangala main road		30
	Total length	790

FRIDAY – II & IV Week

Locality	*Length (m)*
New Thippasandra — Main Road (near Hotel Raghavendra)	100
" — near Jagadish Hair Dressers	30
" — In front of House No.69	10
Nagavarapalya — Near Anjaneya Temple	85
" — Opp. of Byappanahalli Police Station	25
" — Backside of Anjaneya Temple	40
Murugeshpalya — Opp. of Bus Stop	10
" — Narayanareddy colony No.125	45
" — Nanjareddy colony, 2nd Cross, No.52	35
" — Manjunatha Temple, No.17	40
" — Near Govt. Middle School	20
" — Behind Govt. Middle School from HAL Main Road to compound	365
Total length	805

SATURDAY – II & IV Week

Locality	*Length (m)*
Murugeshpalya — New Chandrappa line	50
" — Bhoomireddy line No.35	80
" — New Kaliappa line	80
Jeeva Bheemanagar — In front of S.V. Engineering Workshop	50
" — near Holy Heart Girls High School	35
" — In front of HAL Quarters	35
" — near St. Antony Church	50
" — Bidwend Complex	35
" — Hanuman Nagar, No.51	10
" — HAL Road, Railway Bridge, Hanuman Nagar	100
" — Near Electrical Pillar	100
Total length	625

INSECTICIDES REQUIREMENT PER ANNUM

1.	Fenthion (82.5% E.C)	...	...	200 Lit.
2.	M.L. Oil	...	...	800 Lit.

Others:

Expanded Polystyrene Beads	20 Kg.

Additional Equipments:

Scrappers	...	...	4 Nos.
Spades	...	...	4 Nos.
Bonds	...	...	4 Nos.

TABLE 92

List of Cesspools requiring filling work

Locality	Length	Width	Surface area (m^2)
B. Narayanapura village (White field road)	10	8	80
"	10	7	70
"	10	15	150
"	20	16	320
"	30	15	450
Srinivasapura Suddakuntepalya Near LRDE Factory	9	5	45
Near GTRE Factory	3	2	6
V Main Road, Indranagar	20	7	140
New Thippasandra:			
Right side of Sangeetha Provisions Stores	25	10	250
Nagavarapalya Opposite to Peerless Company	10	4	40
Opp. Fair Price shop	10	4	40
Murugeshapalya:			
No.14, Nanja Reddy Colony	20	15	300
Opp. No. 103, 17th Cross–NR Colony	40	30	1200
Shivanna Colony, No.24, Opp. Veena Commercial Shop	100	60	6000
Behind Church, Padma Nilaya	15	10	150
Nearby Govt. High School	5	3	15
Side of HAL Compound	45	40	1800
HAL Main Road — Kalappa Layout No.343	10	10	100
No.59, Right side	25	15	375
Konendu Agrahara			
In front of Mahaveer Stores	25	10	250
Jeevan Bheemanagar:			
Nearby S.V. Engineering workshop	15	10	150
I Cross, Sudamanagar	7	5	35
In front of HAL Quarters	20	10	200
Backside of Anandapura	65	25	1625
Backside of Holy Heart Girls High School	30	15	450
Hanuman Nagar:			
Nearby House No.51	15	10	150
HAL Workshop side	30	15	450
No.58, Hanuman Nagar	25	15	375
New Thippasandra:			
Right side of Jagadesh Hair Dressing	10	4	40
Geetha Clinic Main Road	20	10	200
Opp. Mangalore Tailors	10	3	30
"	5	3	15

TABLE 93

List of Cesspits requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
B. Narayanapura	1	1	1
Veena Illam	1	1	1
Venkateswara Colony	1	1	1
,,	0.5	0.5	0.25
,,	0.5	0.5	0.25
,,	0.5	0.5	0.25
,,	0.5	0.5	0.25
Srinivasapura Suddakentepalya			
GTRE Factory backside	2	1	2
Annasandrapalya I Cross, No.7	2.5	1.5	3.75
New Thippasandra Shedel Electrical No.91	1	1	1
Nagavara palya:			
Opp. to Kala Traders	6	1	6
Left side of Temple	1	1	1
Right side of Peerless Company	2	1	2
House No.21	2	1	2
Murugeshapalya:			
No.35, Nanja Reddy Colony	2	1.5	3
Kullapa Colony Left side No.5	2	1	2
HAL Main Road side of 343	2	1	2
Nearby CDOD & Sons Buildings	7	3	21
Kodihally:			
Backside No. 80/1	2.5	1	2.5
House No.758	2	2	4
Jeevan Bheema Nagar:			
In front of S.V. Engineering workshop	3	2	6

TABLE 94

List of quarry pits requiring filling work.

Locality	Length	Width	Surface area (m^2)
Mahadevapura	250	100	25000
,,	150	135	20250

BYRASANDRA

Corporation boundary

Peripheral boundary

Road Road

Railway line

Tank bund

Water body (Tank)

Breached portion of the Tank

Brick kiln

3.16. HAL RANGE

This range is situated in the eastern side of the city and is bounded in north and west by the Varthur and Sarjapura roads. The range covers an area of about 30 sq.km., a big part of which is occupied by the Bellandur Tank, the largest in the city. Totally fifteen villages have been surveyed in this range which are listed below:

HAL complex area, Kariammana Agrahara, Bellandur, Yemalur, Egipura village, Haralluru, Iblur, Maruthinagar, Sanjeevini Nagar, Jagasandara, Marathahalli, Yemalur A.K. Colony, Vimanapur, Challaghatta and Nagasandra.

Breeding Habitats:

A number of breeding habitats have been surveyed in these villages and they are summarized in the Table 95.

TABLE 95

Measurements of the breeding habitats in the HAL Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	34	34
2.	Cesspools	45	9,879
3.	Wells	109	109
4.	Agriculture Wet lands	—	1,50,00,000
5.	Tanks	1	36,00,000
6.	Drains	25,546	12,773
	U-drains	8,921	
	L-drains	7,275	
	K-drains	9,350	
7.	Storm water canal	5,500	2,000

Control:

a. *Tank*:

Only Bellandur Tank (360 ha) exists in the range. Earlier this most extensive tank was used for growing fish since there was not much pollution in the tank. For the past few years, the tank was getting about 40 million gallons of sewage water every day and consequently became a permanent breeding source for *Culex quinquefasciatus*. The tank supports heavy growth of water hyacinth due to pollution of water which results in the heavy breeding of mosquitoes. The breeding density in the tank is as high as 500–1000 larvae per dip along the bank.

The tank receives sewage and sullage mainly from the Indira Nagar storm water canal which is turned into a sewage canal and through other several open drains as well as the partly treated sewage water (30%) from the K & C Valley sewage Treatment Plant. There are no users for the treated water and therefore, the treated water is poured directly into the Bellandur Tank. The tank water is mostly used for irrigation purposes in the adjoining areas.

Solutions:

1. The problem of Bellandur tank is mainly due to the mixing up of sewage with the tank water. It is therefore strongly recommended that the Indira Nagar storm water canal which is the source of pollution for the tank should be diverted into the valley which is 2–3 km. away from the tank for natural disposal. Similarly, the partly treated sewage from the K & C Treatment Plant should also be diverted away from the tank by connecting it to the above mentioned diverted Indira Nagar storm water canal.

2. The water hyacinth should be regularly removed from the tank to prevent mosquito breeding.

3. As the water becomes clearer and less polluted, more number of fish should be released into the tank which will not only control the mosquito breeding but can also improve the economy of the local people.

4. The PWD should hand over the responsibility of maintenance of the tank to the BDA which can enforce the existing law for maintaining the tanks in the city for aesthetic and economic reasons.

b. *Storm water canals*:

There are four major storm water canals in the range.

b 1. *Indira Nagar Storm water canal (2 km.)*:

This major canal originates from the Shivaji Nagar range in the heart of the city and finally terminates into the Bellandur tank. This canal collects sewage from a subsidiary Koddihalli drain which is often blocked with water hyacinth and silt. The main Indira Nagar storm water canal is a well lined canal, provided with a cunette, excepting the part of the canal within the aerodrome area (0.5 km.) where it is unlined and full of weed growth. Heavy mosquito breeding has been noticed in the Koddihalli drain as well as in the K-drain part of the Indira Nagar drain in the aerodrome area.

Solutions:

1 The HAL/aerodrome authority should immediately line the canal for its entire length and reularly clean it to prevent mosquito breeding.

2. As a permanent solution, the canal should be diverted away from the tank and led into the K & C Valley for natural disposal. (The PWD has proposed to divert the canal at the cost of Rs. 1 crore which is under consideration).

3. The Kodihalli canal should be cleaned off silt and weeds tc ensure free flow of water.

b.2. *Akkipet storm water canal (2 km.)*:

This major canal originates from the Akkipet area in the north eastern side of the Bellandur tank and finally meets the tank on the westward stretch near Koramangla lay out. This canal is a lined canal provided with a cunette but soon after the corporation limit it is an unlined canal and full of silt and weed growth. The canal is connected to two major subsidiary canals, namely, Austin town canal (Shanthi Nagar range) and Koramangala canal on its way to the Bellandur tank. Both these canals are, however, existing within the corporation limits. A K-drain (0.5 km.) starting from Agaram Tank also meets the Akkipet canal just before the tank.

Solutions:

1. The canal should be lined fully and deweeded regularly. This should be also cleaned at fortnightly intervals.

2. The canal from the Agaram tank should also be deweeded and cleaned regularly. It should be rechannelized.

b.3. *Marathahalli storm water canal (0.5 km.)*:

This is a major storm water canal starting from Marathahalli area and after traversing about 0.5. km. area on the fringe of the range it joins the outlet drain from the Bellandur tank at about 2 km. from the tank. This is a kutcha drain with full of grass and weed.

Solutions:

1. The whole length of the drain should be lined.

2. The drain should be rechannelized.

3. Till the completion of lining, the drain should be kept free from silt and weed at regular intervals.

b.4. *Vimanapura storm water canal (1 km.)*:

This storm water canal originates from Vimanapura Colony and leads into the Bellandur tank after passing through Campapurna Agrahara village. The canal is full of water hyacinth which block the free flow of water and provide an ideal ground for mosquito breeding almost throughout its length.

Solutions:

1. Water hyacinth should be removed and the

drain should be kept free from silt at regular intervals.

2. This drain should also be diverted away from the tank if it could not be kept free from sewage etc.

c. *Cesspits and Cesspools*:

There are 34 cesspits and 45 cesspools in the whole range. They must be essentially filled and levelled up with silt and garbage etc. collected from the drains under cleaning. Cesspits, however, should be sprayed with fenthion at the recommended dose of 1 ppm until they are obliterated (Tables 96 and 97).

d. *Wells*:

There are 109 wells in the range. Most of them are in use, and do not have any mosquito breeding. In the few unused wells, breeding can be controlled by either releasing fish or by applying expanded polystyrene beads at the rate of about 500 g/m^2.

e. *Agricultural wet lands*:

Vast stretches of agricultural wetlands receive water directly from Bellandur tank. The sewage mixed water of the tank forms a potential ground for mosquito breeding in the agricultural fields. This problem can be overcome only by better water management and avoiding any pool formation either in the agriculture conduits or the fields.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz.*, spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	11
2.	Cleaning/Deweeding		—	6
3.	Monitoring (Search and Evaluation)	—	12	—

SPRAY SCHEDULE FOR HAL RANGE

MONDAY

HAL Complex area, Kariammana Agrahara, Bellandur village.

TUESDAY

Yemalur, Egipura village.

WEDNESDAY

Haralluru, Iblur village.

THURSDAY

Maruthinagar, Sanjeevini Nagar, Jagasandra.

FRIDAY

Marathahalli, Yamalur—A.K. Colony, Vimanapura.

SATURDAY

Challaghatta, Nagasandara.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN HAL RANGE

MONDAY – I & III Week

Locality		*Length (m)*
EGIPURA —	Main Road (Extension)	200
”	Opp. Ibrahim House	25
”	Annaiah House side	100
”	Jopadi St. — Opp. Flour Mill	400
	Total length	725

TUESDAY – I & III Week

Locality		*Length (m)*
EGIPURA —	Paradise Kennels	100
”	2nd Cross Road	100
”	Rama Temple Road	400
”	Opp. House No.145/2	10
”	Opp. House No.287	100
	Total length	710

WEDNESDAY – I & III Week

Locality		*Length (m)*
EGIPURA —	Nearby 531/1 Thimmaiah House	30
”	Beemanna line	500
IBBALUR —	4th Main Road (small lane)	100
JAKKASANDRA —	Main Road	150
	Total length	780

THURSDAY – I & III Week

Locality		*Length (m)*
JAKKASANDRA —	Site No.4945	80
”	S.S. Sarwade Police Department	30
”	N. Parameswaraiah Police Department	100
BELLANDUR —	1st Main Road	500
	Total length	710

FRIDAY – I & III Week

Locality		*Length (m)*
BELLANDUR — 2nd Main Road		450
” 3rd Main Road		250
	Total length	700

SATURDAY – I & III Week

Locality		*Length (m)*
BELLANDUR — 2nd Cross		500
YEMALUR — 1st Main		300
	Total length	800

MONDAY – II & IV Week

Locality		*Length (m)*
YEMALUR — 2nd Main		600
” 1st Lane		100
	Total length	700

TUESDAY – II & IV Week

Locality		*Length (m)*
YEMALUR — 2nd lane		200
” 3rd lane		100
” Side of kutcha Road		50
” Primary School Road		70
” Connection to Bellandur Tank		500
	Total length	920

WEDNESDAY – II & IV Week

Locality		*Length (m)*
YEMALUR —	HAL Road, Bellandur 4th Cross	150
”	Bellandur Main Road	500
”	Temple Backside Road	100
	Total length	750

THURSDAY – II & IV Week

Locality		*Length (m)*
YEMALUR —	2nd Main Road	200
	3rd Main Road	150
EGIPURA —	Muniyellappa House	20
”	Venkateswara Flour Mill	200
”	Near to above	200
	Total length	770

FRIDAY – II & IV Week

Locality		*Length (m)*
JAKKASANDRA —	Janatha Colony	60
”	Sharadamma No.35	50
”	Albert Police Department	160
”	Near Basavanna Temple	40
MARATHAHALLI —	Varthur Main Road Fuel Shop	25
”	Back side of Revsobo Church	15
”	Near Bore well	55
”	Govt. Primary School	80
”	Nagalakshmi Elu Cross	10
”	Last House of 9th Cross	10
PANATHUR	Near Village Panchayat Office	35
”	House No.141	30
”	Family Planning Centre	80
	Total length	650

	Locality	*Length (m)*
PANATHUR	Near Agricultural Co-op. Society	25
”	Railway Bridge Bellandur Road	70
”	No.6, Left side of the house	50
”	Village Panchayat Office	35
”	Opp. House No.141 — Left side	20
”	Both sides of Family Planning Office	80
”	Near to above	30
”	Agricultural Co-op. Society back side	25
”	Near Amar Tailors No.6	120
NAGASANDRA	Near Brick line	15
”	Anjaneyappa Temple Road 3rd Cross	40
”	Left side of Bridge	25
”	Back side of Govt. Primary School	25
CHELLAGHATTA	Left side of Manjunatha Bar, No.20	120
”	Manjunatha Coffee Main Road	30
	Total length	710

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	250 lit.
2.	M.L. Oil	...	...	1000 lit.

Others:

Expanded Polystyrene Beads	...	...	25 kg.

Equipments:

Spades	...	...	5 Nos.
Bonds	...	...	5 Nos.
Scrapppers	...	...	5 Nos.

TABLE 96

List of Cesspools requiring regular spraying/releasing of fish till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Egipura Extension — End of village Road	10	10	100
Maruthinagar			
Muneeswara hill side	45	25	1125
Sanjeevini Clinic Right side	6	4	24
No.114	15	10	150
Back side of Muneeswara hill	20	6	120
”	9	4	36
”	7	4	28

Locality	Length	Width	Surface area in sq.mt.
No.36 Opposite side	10	4	40
Anjaneya Swamy Temple Kunte	15	10	150
No.104, Side Road	15	10	150
Water tank road	25	20	500
Near I Cross Road	40	25	1000
Near Srinivasa Cycle Mart	15	10	150
Left side of Anjaneya Temple Main Road	9	4	36
Maruthahally			
Revsorbo Complex	30	20	600
Back side of the Church	40	30	1200
Right side Borewell	10	6	60
Teacher Training College Road	15	8	120
Back side of House No.41	9	6	54
Back side of Mutton Stall	30	10	300
House No.141	6	3	18
Tulasi Talkies back side	3	3	9
Sanjaynagar 9th Cross	15	7	105
Opposite Rajeswari Bar	9	4	36
6th Cross No.210 & 211	6	4	24
No.126, 4th Cross	15	3	45
Sanjaynagar Main Road	25	25	625
Panathur			
In front of village Panchayat Office	30	25	750
Near Poultry Farm	25	10	250
Left side of BTS Bus Stand	20	10	200
Near to above	15	6	90
In front of Railway Quarters	8	6	48
Left side of Govt. bore well	10	10	100
Near Post Office	25	15	375
Near Poultry Farm	20	10	200
Near Poultry Farm	25	15	375
Near Poultry Farm	15	5	75
Opposite to Railway Quarters	8	7	56
Opp. to Railway Quarters	6	4	24
Opp. Family Planning Office	4	3	12
,,	3	3	9
Right side of Post Office	25	10	250
Yemalur — A.K. Colony			
House No.131, Eswara Temple left side	10	4	40
Nagasandra			
Near Brick line	20	10	200
Chellaghatta			
Opposite KEB pillar	20	1	20

TABLE 97

List of cesspits requiring regular spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Bellandur — II Main Road	1	1	1
,,	2	1	2
,,	1	1	1
Yemalur — Primary School Road	0.5	0.5	0.25
,,	0.5	0.5	0.25
,,	0.5	0.5	0.25
,,	0.5	0.5	0.25
,,	1	0.5	0.5
,,	0.5	0.5	0.25
Egipura village			
Back side of Peter House	2	2	4
Egipura Extension Ramesh House	1.5	1.0	1.5
No.95/3	1	1	1
Front of Ashoka Industries	2	1	2
Back side of Rama Temple	1	1	1
Rajanna Building opposite	5	3	15
Iblur 3rd Cross	3	3	9
Maruthinagar			
Right side — Sanjeevini Clinic	2.5	1.5	3.75
Jakkasandra village			
Side of Bore well	4	3	12
Door No.12, Munisamy	0.5	0.5	0.25
Near Muniramappa House	1	1	1
Maruthahally			
Srinivasa Talkies back side	4	2	8
7th Cross No.712	2	2	4
1st House of 5th Cross	2	1	2
Panathur			
Family Planning Building	4	2.5	10
No.23, Front side	2.5	1.5	3.75
Yemalur — A. K. Colony			
No.80, in front of temple	2.5	1	2.5
,,	1.5	1	1.5
No.28, Eswara Temple Road	3	2.5	7.5
Nagasandra			
No.28	7	1	7
Opposite Bore well	2	1	2
Opposite Govt. Primary School	4	1	4
Near Main Road bridge	3	1	3
Chellaghatta			
House No.4	4	1	4

H.A.L.
VIMANAPURA
Varthur Road
MARATHA HALLI
CHALLACHATTA
KEMPAPURA
YAMALUR
EJIPURA
NAGASANDRA
JAKKASANDRA
Bellandur Tank
KARIYAMMANA AGRAHARA
IBBALUR
BELLANDUR
Sarjapura Road
Corporation boundary
Peripheral boundary
Road
Tank bund
Water body (Tank)
Airport
Canal

3.17. AGARAM RANGE

This range is situated in the southeastern side of the city and is bounded by the Sajarpura and Hosur Roads in north and south respectively. The range covers approximately an area of 25 Sq.km. A total of nine villages are located in this range which are listed below:

Agaram, Mangammannapalya, Bommannahalli, Chickannahalli, Doddabegur, Garwaybavipalaya, Chickkabegur, Chinnasandara, Kalyana Agrahara.

Breeding Habitats:

Various types of breeding habitats have been surveyed in this range and their measurements are given in Table 98.

TABLE 98

Measurement of the various breeding habitats in Agaram range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	3	3
2.	Cesspools	17	1,432
3.	Wells	101	101
4.	Tanks	4	8,90,00,000
5.	Drains:*	32,060	16,030
	(i) U-Drains	11,185	
	(ii) L-Drains	4,600	
	(iii) K-Drains	16,275	
6.	Agricultural Wetlands	—	50,00,000

* In Table 99 list of drains requiring yearly cleaning is presented.

Control:

a. *Tanks*:

There are four tanks in the range, but only Agaram tank is receiving the sewage through the Madivala drain. This drain does not come within the Corporation limit and it is desirable to permanently divert the drain away from the tank. Mosquito breeding in the tank can be controlled by releasing larvivorous fish like *Gambusia affinis*, which can tolerate pollution. The tank is also full of water hyacinth which should be regularly removed to prevent mosquito breeding. The BDA, in whose jurisdiction the tank is located, should take proper steps to keep the tank free from weed growth and sewage water.

b. *Cesspits and Cesspools*:

There are only three cesspits and 17 cesspools in the range. These habitats should be permanently filled up and levelled with the silt and garbage removed from the drains while cleaning. Till the completion of filling work, either spraying or releasing of fish should be carried out depending on the size and the extent of pollution of the breeding habitat. (Tables 100 and 101).

c. *Wells*:

Overall 101 wells are found in the range. Most of them are in use and therefore, do not support mosquito breeding. Those wells which are not in use are found to breed *Anopheles stephensi*. Breeding in the unused wells can be controlled by either releasing fish such as *Gambusia* or *Tilapia* or by applying the expanded polystyrene beads at the rate of 500 g/m^2.

d. *Agricultural Wetlands*:

Agricultural fields in the area receive water from Agaram Tank and are having potential to be the breeding grounds for mosquitoes if pool

formation is allowed for longer periods. It is important that the agriculturists should be properly educated to avoid water stagnation in their fields to prevent mosquito breeding. The tank water used for irrigation should be kept free from pollution by either preventing the sewage water from Madivala drain or by proper water management in the fields.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	11
2.	Cleaning/Deweeding		—	5
3.	Monitoring (Search and Evaluation)	—	9	—

SPRAY SCHEDULE FOR AGARAM RANGE

MONDAY

Agaram, Mangammanapalya.

TUESDAY

Bommanahally, Chikkanahally.

WEDNESDAY

Doddabegur, Garwaybavipalya.

THURSDAY

Chikkbagur

FRIDAY

Chinnasandra

SATURDAY

Kalyana Agrahara

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN AGARAM RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Bommanahalli — Gunithope Main Road left side	200
" — Nearby Leyland Lorry Service	30
" — Devi Engineering	100
" — R. C. Hotel	50
" — M. K. Automobiles	50
Total length	430

TUESDAY – I & III Week

Locality	*Length m)*
Devara Chikkanahalli — Starting village point	200
" — Side of Hanuman Temple	30
" — Near No.29, Post Office street	260
Total length	490

WEDNESDAY – I & III Week

Locality	*Length (m)*
Dodda Begur — From Vivekananda Medical Storc to Coconut shop	150
" — Near Chinnasamy reddy house	50
Garwaybavipalya — Front of Anjaneya Temple	100
" — Aswatha Katte road	100
" — Balaji fair price shop	100
Total length	500

THURSDAY – I & III Week

Locality		*Length (m)*
Garwaybavipalya — Main Road, ICP Pvt. Ltd.		20
" — Hosur Main Road side		100
Agaram — West Street 2nd Cross		150
" — West Street 3rd Cross		100
	Total length	370

FRIDAY – I & III Week

Locality		*Length (m)*
Agaram — South street right side		300
" — South street left side		300
	Total length	600

SATURDAY – I & III Week

Locality		*Length (m)*
Agaram — South street 1st and 2nd Cross		70
" — South street 3rd Cross		60
" — South east street cross		300
	Total length	430

MONDAY – II & IV Week

Locality		*Length (m)*
Agaram — East Street		500
" — East Street 1st Cross		20
" — East Street 2nd Cross		30
	Total length	550

TUESDAY – II & IV Week

Locality		*Length (m)*
Bommanahally Village	— Near Stepno Glass & Plywood shop	500
”	— Near Selvakumar Restaurant	25
”	— Near Karnataka Coffee bar	20
	Total length	545

WEDNESDAY – II & IV Week

Locality		*Length (m)*
Bommanahally Village	— Begur road	100
”	— Anekal road — right side	300
	Total length	400

THURSDAY – II & IV Week

Locality		*Length (m)*
Bommanahally Village	— Near Ganesha Auto rickshaw stand	15
”	— Near Bhanusha House	25
”	— Post Office Road	50
”	— Anekal Road left side	300
	Total length	390

FRIDAY – II & IV Week

Locality		*Length (m)*
Bommanahally Village	— Open Field Aralagunte	250
”	— Open Field Aralagunte	250
	Total length	500

SATURDAY – II & IV Week

Locality	*Length (m)*
Chinnasandra — Gopalreddy house to lake	500
" — Gurumoorthy house to Gopalreddy house	100
Total length	600

INSECTICIDE REQUIREMENT PER ANNUM

1.	Fenthion (82.5% E.C)	...	...	250 Lit.
2.	M.L. Oil	...	...	1000 Lit.

Others:

Expanded Polystyrene Beads	12 Kg.

Equipments required:

Spades	...	...	5 Nos.
Bonds	...	...	5 Nos.
Scrappers	...	...	5 Nos.

TABLE 99

List of drains requiring one-time cleaning in Agaram range.

Locality	Type of drain	Length	With	Surface area (m^2)
Agaram:				
Temple street	Ce/U/UC	400	0.5	200
West Street	"	500	0.5	250
School Road	"	800	0.5	400
Chinnasandra				
Gurumurthy Reddy house to Main Road	"	700	0.5	350
Ellappa Reddy house to Main Road	"	500	0.5	250

TABLE 100

List of cesspools requiring regular spraying till the completion of filling work in Agaram range.

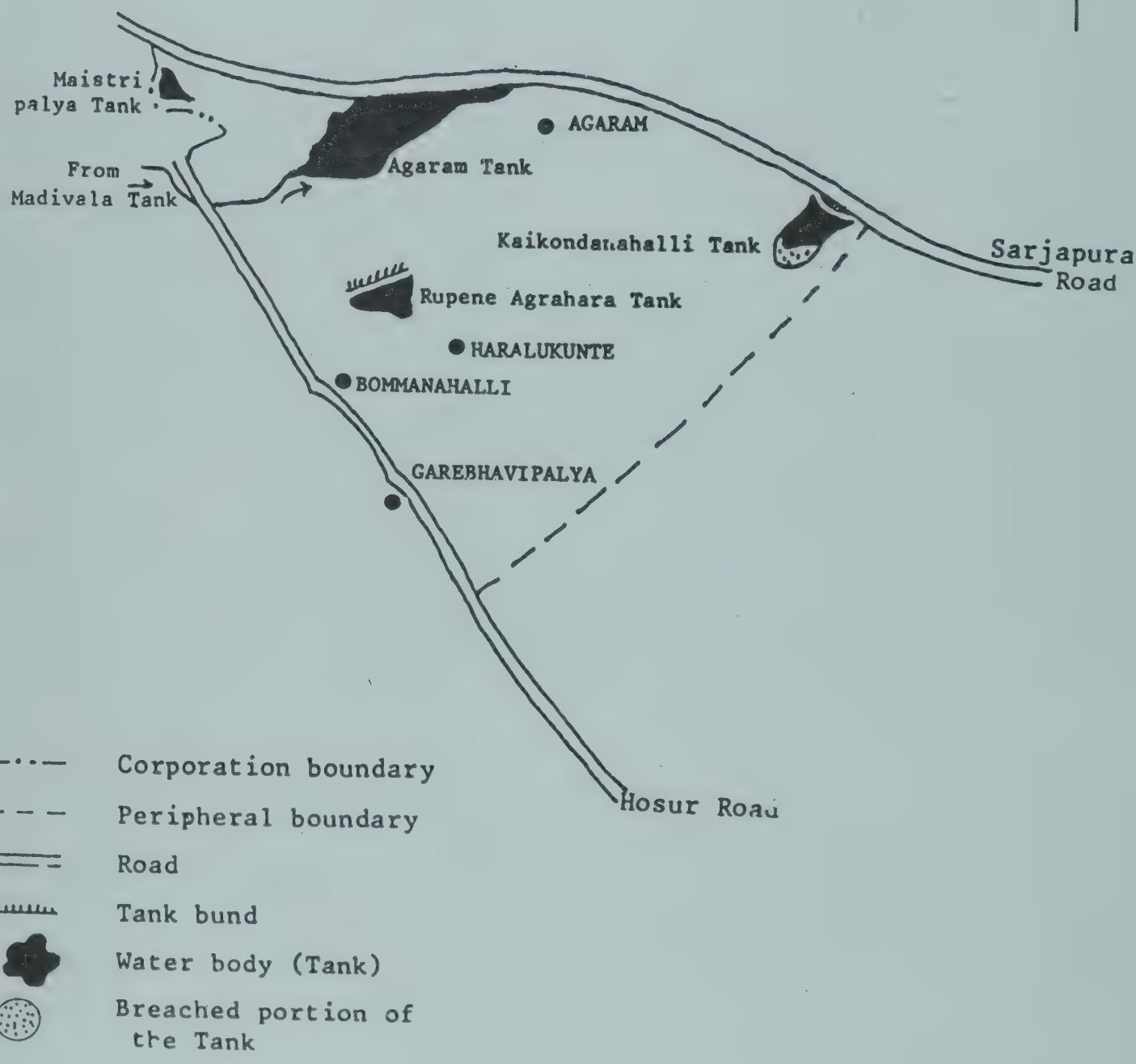
Locality	Length	Width	Surface area (m^2)
Bommanahally			
Main Road end	20	10	200
Nearby Main Road	20	10	200
Opposite Moris Handling Engineering	10	2	20
Devara Chikkanahally:			
A.K. Colony Nearby Muniyappa house	10	15	150
Doddabegur			
Balaraj Garden	5	5	25
Thomas Garden	5	5	25
Sambu Sahib house	8	8	64
Chickanaiah House	5	2	10
Arokiasamy House	15	2	30
Thomas House	20	5	100
Arokiasamy House	15	6	90
Opposite to Venkatasamy house	10	4	40
Left side of Basappa house	10	5	50
Karimaya house	8	8	64
Muni Bhagyamma house	6	4	24
Garwaybavipalya			
Opp. Karnataka Tea house	10	10	100
Hosur Main Road	60	40	2400

TABLE 101

List of cesspits requiring regular spraying till the completion of filling work in Agaram range.

Locality	Length	Width	Surface area (m^2)
Bommanahally			
Govindappa House	1	1	1
Doddabegur			
Ramaiah house	1.5	1	1.5
James house	3	3	9

AGARAM


Maistri palya Tank
From Madivala Tank
AGARAM
Agaram Tank
Kaikondanahalli Tank
Sarjapura Road
Rupene Agrahara Tank
HARALUKUNTE
BOMMANAHALLI
GAREBHAVIPALYA
Hosur Road
Corporation boundary
Peripheral boundary
Road
Tank bund
Water body (Tank)
Breached portion of the Tank

3.18. MADIWALA RANGE

This range is located in the southern side of the city and covers an area of about 25 sq.km. The range is bounded on east and north by Hosur and Anekal roads respectively. A total of fifteen villages are located in this range which are listed below:

Hungasandra, Ram Krishna Nagar, Palakhahalli, Bellikahalli, KEB lay out, Arakere. Ulimavu, Ulimavu (South), Checkpost Mico layout, Devarachikkahalli, Kodichikkanahalli, Roopana Agrahara, Old Madivala, Gurupanapalaya, Swaminatha Garden.

Breeding Habitats:

Various breeding habitats in the range have been surveyed and their measurements are presented in the Table 102.

TABLE 102

Measurements of the breeding habitats in the Madiwala Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	11	42
2.	Cesspools	18	2,048
3.	Tanks	4	33,50,000
4.	Wells	57	57
5.	Agriculture Wet lands	—	1,20,00,000
6.	Quarry pits	2	8,314
7.	Drains:*	36,300	18,150
	U-Drains	10,150	
	L-Drains	1,340	
	K-Drains	24,810	

* In Table 103, list of drains requiring yearly cleaning is presented.

Control:

a. *Tanks*:

There are four tanks, namely, Madivala, Ulimavu, Arkere and Begur tanks in the range. All these tanks are free from pollution, weed growth and mosquito breeding. These tanks are filled with rain water which is used for irrigation in the surrounding area. In view of the growing urbaniation of the city, it is felt that these tanks can no longer be free from pollution. Therefore the authorities like PWD and BDA should plan in advance to conserve the purity of water in ponds and tanks by enforcing the existing public health act.

b. *Cesspits and Cesspools*:

There are only four cesspits and 12 cesspools. Since the number of these breeding habitats is small, it is desirable to completely fill these as a permanent measure to control mosquito breeding. However, till that time, these habitats can be sprayed with fenthion at the optimum dose of 1 ppm. (Tables 104 and 105.)

c. *Wells*:

There are altogether 51 wells in the range. Nearly all these wells are in use and free from mosquito breeding. However, mosquito breeding in few wells which are not in use can be controlled by either releasing fish such as *Gambusia* or *Tilapia* or by applying the expanded polystyrene beads at the rate of 500 g/m^2.

d. *Quarry pits*:

All quarry pits should be necessarily filled and levelled up to avoid any likelihood of forming

a potential breeding ground for mosquitoes. (Table 106.)

e. *Agricultural wet lands*:

There is generally no mosquito breeding in the agricultural fields in the range, since they receive water supply from the unpolluted, clear-water tanks. In future, any possibility of these sites to turn into a breeding ground for mosquitoes should be prevented by educating the agriculturists to avoid any pool formation for longer periods.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	15
2.	Cleaning/Deweeding		—	8
3.	Monitoring (Search and Evaluation)	—	9	—

SPRAY SCHEDULE FOR MADIWALA RANGE

MONDAY

Hungasandra, Rama Krishna Nagar, Devarachickannahalli.

TUESDAY

Bellikahalli, Palakhahalli, Old Madivala.

WEDNESDAY

KEB Layout, Kodichickkanahalli, Arakere.

THURSDAY

Ulimavu, Roopna Agrahara.

FRIDAY

Ulimavu (South), Gurupanapalaya.

SATURDAY

Checkpost — Mico layout, Swaminath Garden.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN MADIWALA RANGE

MONDAY – I & III Week

Locality		*Length (m)*
HUNGASANDRA — IV lane		100
RAMKRISHNA NAGAR — Opp. Veterinary Hospital		100
PALAKHALLY — Ramaiah House to Ellappa House		30
”	Mariyapa House to Ellappa House	100
”	Muthappa House to Sankarappa House	200
”	Muniyappa House to Govindappa Shop	300
BITTEKAHALLY — Front of Moogappa House		200
”	— Sampath House (Chairman)	10
	Total length	1,040

TUESDAY – I & III Week

Locality		*Length (m)*
BITTEKAHALLY — Korachappa House		150
”	Munikrishna House	110
”	N. Narasimhaiah — Krishnappa House	70
”	Chinnaiah House	10
”	Opposite to Jalakappa House	70
ARAKERE	Balaji Poultry Farm Road side	200
”	Anjaneyasamy Temple Road	200
”	Front of House No.20	50
”	Nearby Thippanna House	10
ULIMAVU	Vijaya Ramamurthy House	20
”	East side	100
”	Ramakrishna Temple	200
	Total length	1,190

WEDNESDAY – I & III Week

Locality		*Length (m)*
ULIMAVU SOUTH — In front of Primary School		25
”	East of School	50
”	In front of Manjunatha tiffin room	10
”	Back side of Chairman's House	10
”	Front side	50
”	Side of above	5
”	M. Ramaiah Bande Road	25
”	Village Main Road	60
DEVARA CHIKKANA HALLI — 1st Main Road		500
”	2nd Main Road	500
	Total length	1,235

THURSDAY – I & III Week

Locality		*Length (m)*
OLD MADIVALA —	2nd Main Road	200
”	1st Cross	400
”	4th Main right side	400
	Total length	1,000

FRIDAY – I & III Week

Locality		*Length (m)*
OLD MADIVALA —	4th Main — left side	400
”	3rd Cross	300
”	5th Cross	300
	Total length	1,000

SATURDAY – I & III Week

Locality		*Length (m)*
OLD MADIVALA —	6th Cross	400
KODICHIKKANAHALLY —	Near Nandini Cycle shop	500
”	Near Chikkamuniyappa House	500
	Total length	1,400

MONDAY – II & IV Week

Locality		*Length (m)*
KODICHIKKANAHALLY —	Village to Madivala Tank, First half	1,000
	Total length	1,000

TUESDAY – II & IV Week

Locality		*Length (m)*
KODICHIKKANAHALLY —	Village to Madivala Tank, Second half	1,000
	Total length	1,000

WEDNESDAY – II & IV Week

Locality		*Length (m)*
KODICHIKKANAHALLY —	Near Bore Well	200
ROOPANA AGRAHARA	Hosur Road	500
”	Rajakumar sangha	200
”	United marble company	15
”	A. K. Colony, Kakappa House	100
DEVACHIKKANAHALLY	Opposite to Aswathakatte	25
”	Hanuma Reddy Road	100
	Total length	1,140

THURSDAY – II & IV Week

Locality		*Length (m)*
KODICHIKKANAHALLY —	2nd Main Road	200
”	Begur Main Road	250
”	3rd Cross	200
GURUPPANAPALYA	3rd Main Road	500
	Total length	1,150

FRIDAY – II & IV Week

Locality		*Length (m)*
GURUPPANAPALYA —	2nd Main Road	500
”	4th Main Road	500
	Total length	1,000

Locality		*Length (m)*
GURUPPANAPALYA —	5th Main Road	500
”	5th Main, 1st Cross	300
”	6th Main	500
	Total length	1,300

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	300 lit.
2.	M.L. Oil	...	...	1,200 lit.

Others:

Expanded Polystyrene beads	...	...	30 kg.

Equipment Required:

1.	Spades	...	...	10 Nos.
2.	Bonds	...	...	12 Nos.
3.	Scrappers	...	...	12 Nos.

TABLE 103

List of drains requiring one time cleaning in Madivala Range.

Locality	Type of drain	Length	Width	Surface area (m^2)
Palakhally:				
Gowdappa House to Papanna House	Ce/U/UC	150	0.5	75
Muniyappa House to Krishnappa House	”	150	0.5	75
Papanna House right side	”	250	0.5	125
Munikondappa House	”	300	0.5	150

TABLE 104

List of Cesspits requiring regular spraying till the completion of filling work in Madiwala Range.

Locality	Length	Width	Surface area (m^2)
Ulimavu			
Vijaya Ramamurthy House	0.5	0.5	0.25
Sri Rama Lingeswara Temple	1	1	1
Ulimavu South			
Back side of Lakshmaiah House	2.5	2	5
Back side of Lakshmaiah House	2.5	2	5
Front side of Chairman's House (M. Ramaiah)	2	2	4
Swaminatha Garden			
III Cross	1	1	1
"	1	1	1
"	1	1	1
Old Madivala			
1st B Cross	1	1	1
4th Cross	1	1	1
Guruppanapalya			
6th Lane	1	1	1
7th Lane	1	1	1

TABLE 105

List of Cesspools requiring spraying till the completion of filling work in Madivala Range

Locality	Length	Width	Surface area (m^2)
Hungasandra			
Right side of Begur Main Road	15	10	150
Arakere			
Nearby Balaji Poultry Farm	10	5	50
Post Office side	5	5	25
Ulimavu (South)			
Rajappa House	10	10	100
Chinnappa — Chandappa House	20	20	400
Rama Temple Road	10	10	100
Checkpost — Mico Layout			
Vysya Bank Colony Near No.29	10	5	50
No.19, 3rd Cross	3	3	9

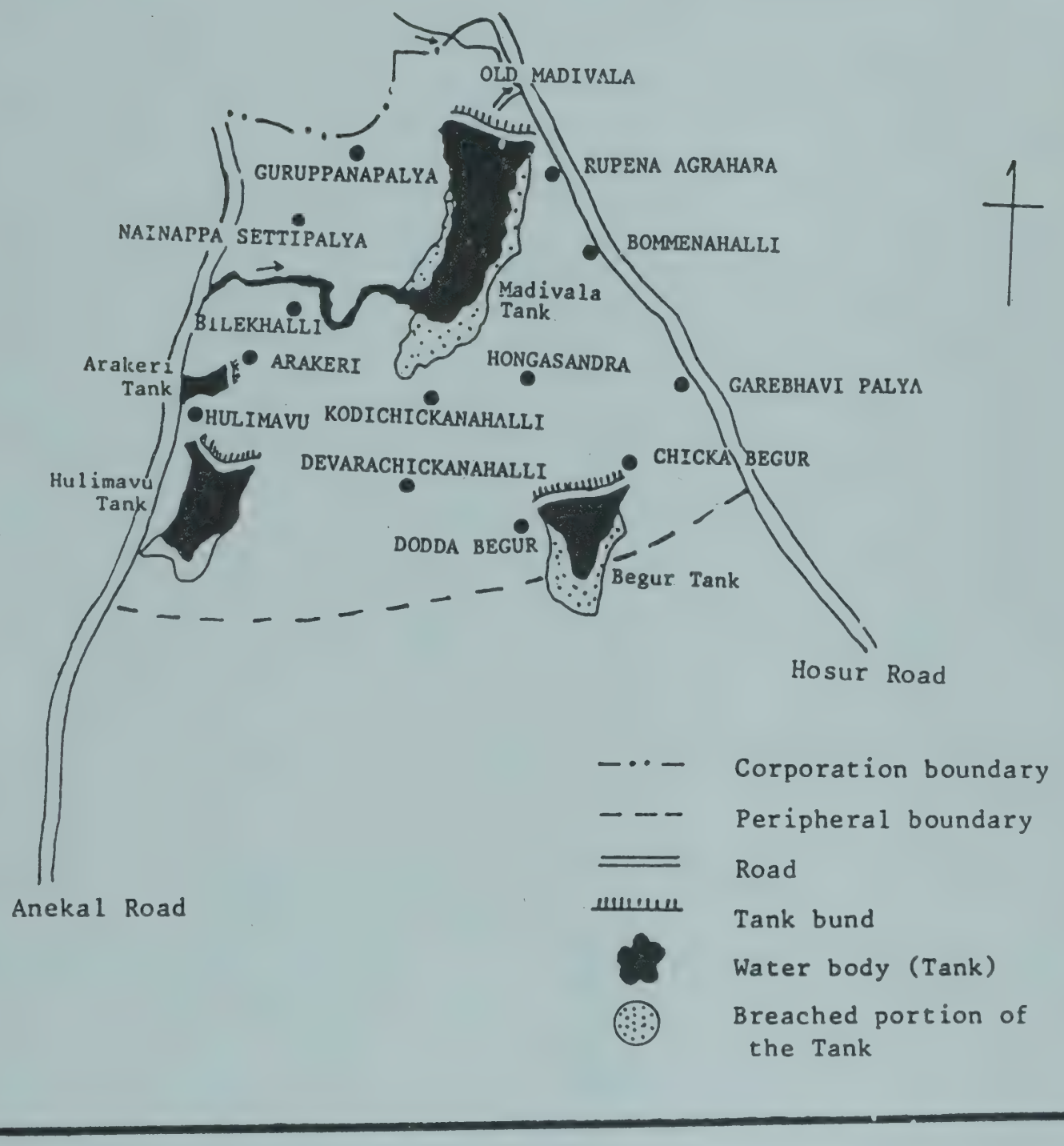
Locality	Length	Width	Surface area (m^2)
Bellikahally			
Village entrance	10	2	20
Kodichikkanahally			
Near slum	25	10	250
KEB Layout			
Banneerghatta Road	5	3	15
Nearby Door No.175 V Block H.G. Ramappa House	5	2	10
Ulimavu South			
Rama Temple Road	5	5	25
Chikkakalasandra	3	3	9
Guruppanapalya			
4th Main Road	5	3	15
Old Madivala			
1st A Cross	20	10	200
1st B Cross	15	10	150
"	25	20	500

TABLE 106

List of Quarry pits requiring filling work in Madivala Range.

Locality	Length	Width	Surface area (m^2)
Ulimavu			
Nearby Muthappa House	14	11	154
Post office side	80	102	8160

MADIVALA


OLD MADIVALA
GURUPPANAPALYA
RUPENA AGRAHARA
NAINAPPA SETTIPALYA
BOMMENAHALLI
Madivala Tank
BILEKHALLI
Arakeri Tank
ARAKERI
HONGASANDRA
GAREBHAVI PALYA
HULIMAVU
KODICHICKANAHALLI
DEVARACHICKANAHALLI
CHICKA BEGUR
Hulimavu Tank
DODDA BEGUR
Begur Tank
Hosur Road
Anekal Road
Corporation boundary
Peripheral boundary
Road
Tank bund
Water body (Tank)
Breached portion of the Tank

3.19. SARAKKI RANGE

This range is situated in the southern side of the city and is bounded by the Anekal and Kanekapura roads along its eastern and western borders. As many as 20 villages have been surveyed in the range which are listed below:

Chengighatta, Kothanur, Puttenhalli, Sarakki Gate, Yellachannahalli (Krishnadevaraya nagar), Gangadharnagar, Jaraganahalli, Konakunta-Kanakapura, K. Bank Colony, Doddakalachandra Marannahalli, Sarakki-Agrahara, Dorasamypalaya, Chettipalaya, J.P. Nagar, Raghavendra Nagar, Vasarahalli, Vajarahalli, Nayanappa Chettipalaya and Voddarapalaya.

Breeding Habitats:

Various types of breeding habitats have been surveyed in the range and their measurements are presented in the Table 107.

TABLE 107

Measurements of the breeding habitats in the Sarakki range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	11	26
2.	Cesspools	17	11,141
3.	Wells	171	171
4.	Tanks	5	14,00,000
5.	Agricultural wetlands	—	1,00,00,000
6.	Drains*	43,963	21,982
	(i) U-Drains	31,968	
	(ii) L-Drains	2,215	
	(iii) K-Drains	9,780	
7.	Storm water canal	3,000	3,000

* In Table 108, list of drains requiring yearly cleaning is presented.

Control:

a. *Tanks*:

There are five tanks in this range, viz., Sarakki, Doraiswamypalya, Doddakalasandra, Kothanur and Kanakunte tanks. But only Sarakki tank receives sewage and therefore is breeding mosquitoes. The tank is connected with the Sarakki drain which originates in the Sarakki layout. Water hyacinth is found to grow profusely in the tank and this further helps mosquito breeding. It is desirable that the Sarakki drain should be diverted away from the tank and led into the valley for natural disposal. The water hyacinth should be removed from the tank regularly. Also fish must be released into the tank for controlling mosquito breeding.

b. *Storm water canals*:

There are two main storm water canals in the range, viz., Sarakki storm water canal and J.P. Nagar storm water canal.

b.1. *Sarakki Storm water canal (1.5 Km.)*:

This canal starts from Sarakki village and after passing through Sarakki Layout it joins with the Sarakki tank. This canal is an open and lined canal without any cunette. This canal receives sewage from the nearby villages. Vegetation and silt are also plenty in the canal thereby affecting the free flow of water in the canal. All these conditions favour mosquito breeding in the canal.

Solutions:

1. The canal should be regularly cleaned and deweeded.
2. Subsidiary drains receiving sewage from the nearby villages should be connected to an underground sewerage system.

b.2. *J.P. Nagar Storm water canal (1.5 Km.)*:

This canal starts from J.P. Nagar and runs through Maranahalli to finally join with the Doraiswamypalaya Tank. This canal is carrying only storm water and no sewage links are found. It is lined and open canal with vegetation growth along its bank.

Solution:

Deweeding should be carried out at regular intervals to avoid water stagnation to prevent mosquito breeding.

c. *Cesspits and Cesspools*:

There are altogether 11 cesspits and 17 cesspools. In view of the relatively smaller number of these habitats, it is desirable that these habitats should be permanently filled up with the silt and garbage removed from other areas, e.g., from drains under cleaning and desilting. (Tables 109 and 110.)

d. *Wells*:

Of the wells existing in this range, only 10–15% of the wells are not in regular use. Such wells collect roughage and provide potential breeding grounds and it should be prevented by either releasing fish such as *Gambusia* or *Tilapia* or applying the expanded polystyrene beads at the rate of 500 g/m^2.

e. *Agricultural wetlands*:

Agricultural fields receive water for irrigation from the above mentioned five tanks. These fields which receive sullage-mixed water from Sarakki Tank are prone to breed mosquitoes in the stagnated water bodies. The agriculturists should be advised not to allow pool formation in the agricultural fields to avoid mosquito breeding.

Environmental management can be a highly successful approach to vector control especially if such measures are incorporated right from the planning and design stage of any development project.

R. BOS & A. MILLS (1987)

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	6
2.	Cleaning/Deweeding		—	9
3.	Monitoring (Search and Evaluation)	—	7	—

SPRAY SCHEDULE IN SARAKKI RANGE

MONDAY

Chengighatta, Kothanur, Pattenahalli, Sarakkigate.

TUESDAY

Yelachannahalli, Gangadhar Nagar, Jaraganahalli.

WEDNESDAY

Konakunte-Kanakapura, K. Bank Colony, Marannahalli, Doddakalachandra.

THURSDAY

Sarakki-Agrahara, Doraiswamypalaya, Chettipalaya.

FRIDAY

J.P. Nagar, Raghavendra Nagar, Vasarahalli.

SATURDAY

Vajarahalli, Nayanappachetty palaya, Voddarapalaya.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN SARAKKI RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Yelachannahalli — 7th Cross	50
" — 7th Cross, Chinnappa house	45
Jaraganahalli — Opp. to Anjanappa house	90
" — Opp. to Vidyanikatesh house	100
" — Near transformer	55
" — Main Road	200
Konakunte — A.K. Colony	150
Doddakalachandra — K.K.S. Factory	550
Total length	1,240

TUESDAY – I & III Week

Locality	*Length (m)*
Doddakalachandra — Govt. Junior School (Left side)	500
" — Govt. Junior School (Right side)	500
Doraisamypalya — Karnataka Kannada Youth Sangh	100
" — Near Bore well	25
Total length	1,125

WEDNESDAY – I & III Week

Locality	*Length (m)*
Puttenahally — Near Poultry Farm (Side of Sarakki tank)	500
" — No.15, J.J. Stores	50
" — J.P. Road	100
" — Sarakki side (near Puttenahally tank)	230
J.P. Nagar — 11th Cross	45
Maranahally — 22nd B road	20
J.P. Nagar 14th Cross	10
Sarakki gate area	230
Total length	1,185

THURSDAY – I & III Week

Locality	*Length (m)*
Sarakki Gate Area — Near Ruthrappa house	100
Jaraganahally — Backside of Lalappa Garden	300
Sarakki — Shakamkinagar	245
Yelachanahally — Nearby Electrical shop	225
" — III Cross	50
" — Near Mission tools	20
Nagenashettipalya — Marathi Flour Mill	90
— 2nd Street	200
Total length	1,230

FRIDAY – I & III Week

Locality	*Lengtá (m)*
Nagenashettipalya — Anjaneya Devasthanam Street	100
Settipalya — II Main Road	100
J.P. Nagar — Annamalai hut	100
" — Side of Rubber Factory	100
" — Bilehally Polypipe Industry	100
Settipalya — Abbaiappa house road	200
" — Near Primary School	100
" — Backside of Anjaneyappaswamy Temple	200
Total length	1,000

SATURDAY – I & III Week

Locality	*Length (m)*
Settipalya — Near Bhubaneswara Temple	500
" — Near Flour Mill	100
Doraisamypalya — Parijatha Refreshments	600
Total length	1,200

MONDAY – II & IV Week

Locality		*Length (m)*
Doraisamypalya — Iyengars Bakery		100
” — Maruthy Industry		500
” — Side of Rubber Factory		500
	Total length	1,100

TUESDAY – II & IV Week

Locality		*Length (m)*
Vajarahally — 1st Cross		400
” — 2nd Cross		200
” — 3rd Cross		300
” — 4th Cross		400
	Total length	1,300

WEDNESDAY – II & IV Week

Locality		*Length (m)*
Raghavendra Nagar — side of house No.14		100
Pipeline-Raghavendra Nagar — Cross road		115
Kalidas Layout Road		100
Sarakki Agrahara — 1st Main		400
” — 2nd Main		400
	Total length	1,115

THURSDAY – II & IV Week

Locality		*Length (m)*
Maranahalli — 1st Main		600
” — 2nd Main		400
” — Near School		300
	Total length	1,300

FRIDAY – II & IV Week

Locality		*Length (m)*
Maranahalli — 3rd Main		400
" — 4th Cross		400
" — 6th Cross		200
" — 7th Cross		200
	Total length	1,200

SATURDAY – II & IV Week

Locality		*Length (m)*
Maranahalli — 4th Main		400
" — Near Iron Factory		400
" — 5th Main		400
	Total length	1,200

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	125 Lit.
2.	M.L. Oil	...	...	500 Lit.

Others:

Expanded Polystyrene Beads	...	...	50 Kg.

Equipment Required:

1.	Spades	...	...	6 Nos.
2.	Bonds	...	...	6 Nos.
3.	Scrappers	...	...	6 Nos.

TABLE 108

List of drains requiring one time cleaning in Sarakki Range.

Locality	Type of drain	Length	Width	Surface area (m^2)
Chengighatta:				
Iyyanna house	Ce/U/UC	200	0.5	100
Dodda Kalachandra:				
Raman House Street	"	150	0.5	75
Manjunatha Hostel	"	600	0.5	300

TABLE 109

List of Cesspools requiring spraying till the completion of filling work in Sarakki Range.

Locality	Length	Width	Surface area (m^2)
Puttenahally:			
Side of Puttenahally Tank	20	10	200
Near Tank towards J.P. Nagar	15	5	75
Sarakki Gate:			
Near Krishnappa house	15	3	45
Opp. K.M. Chandrasekar house site No.13	60	20	1200
Siddappa Compound	25	5	125
Sarakki-Shakambinagar:			
M.S. Ramraju house	100	50	5000
N.V. Halappa Shetty	20	8	160
Gangadharanagar:			
Nearby Ashoka Creations	5	2	10
Near Jayamma House	15	5	75
Dodda Kalachandra:			
Krishnappa house	4	4	15
Doraisamipalya:			
In front of Venkateswara tent	50	50	2500
Near to tent	15	15	225
Nagenashettypalya:			
Near Dynamic Electronics	5	5	25
"	6	5	30
Vacant Plot	40	30	1200
Near N.S. Palya Road	5	6	30
N.S. Palya II Main Road	15	15	225

TABLE 110

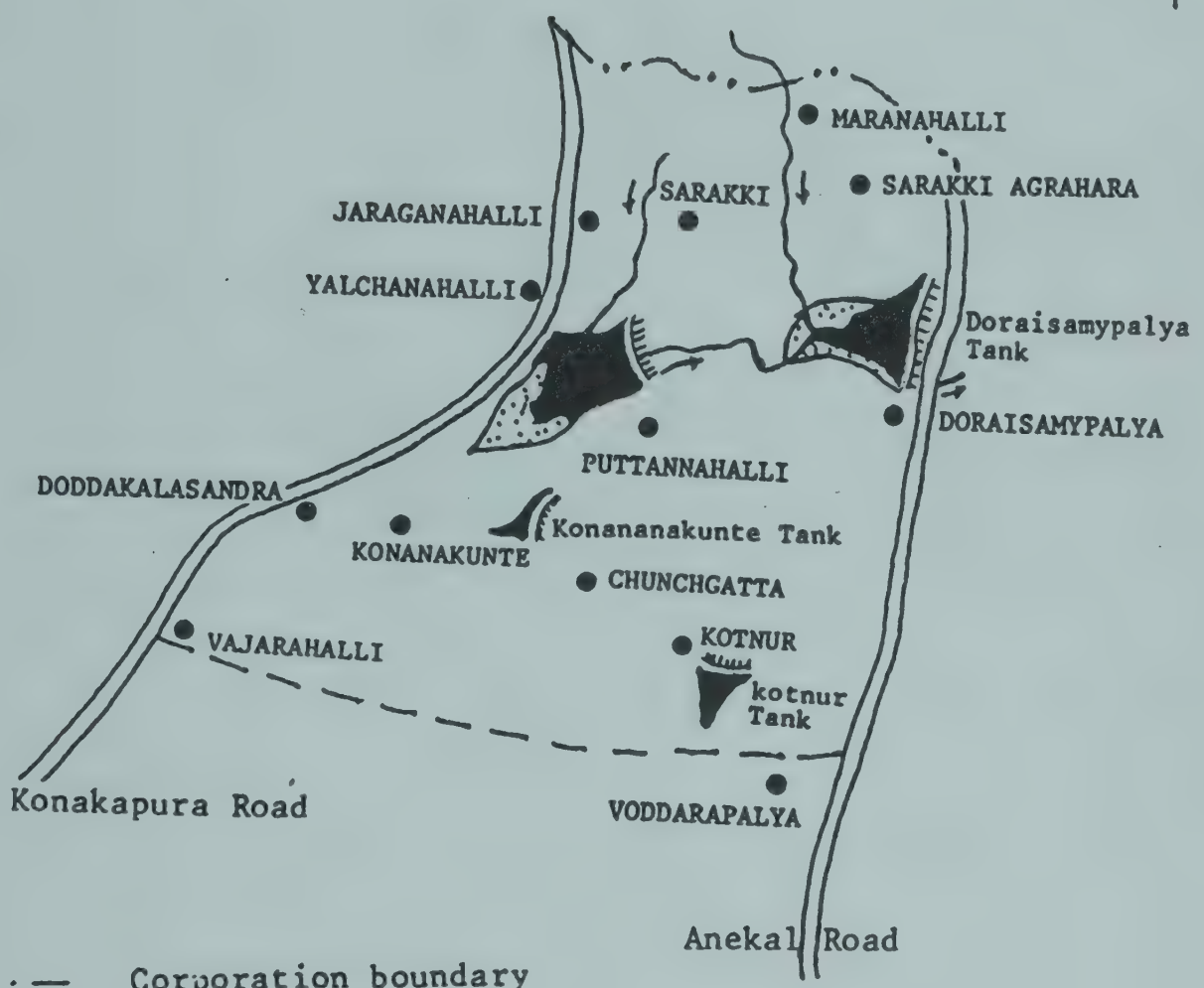
List of Cesspits requiring spraying till the completion of filling work in Sarakki Range.

Locality	Length	Width	Surface area (m^2)
Sarakki Gate:			
Siddappa Compound	5	1	5
Kala site	5	2	10
Jaraganahally:			
M. Muniyappa	1	1	1
Lalappa Garden	1	1	1
Opp. GKM, TCH, Krishnappa	1	1	1
Sarakki-Shakambinagar:			
Nearby Venkatesha Reddy house	2	2	4
Yelachanahally:			
House of Gangaiah	1	1	1
VI Cross, Shamaiah	1	1	1
Vajarahally:			
IV Lane	0.5	0.5	0.25
,,	0.5	0.5	0.25
Nagenashettipalya:			
Near Dynamic Electronic	1	1	1

The urban environment is complex, often involving many different organizations or agencies. Collaboration between such agencies could be a first step towards improving the health status of the urban poor.

T. HARPAM (1986)

SARAKKI



—·· — Corporation boundary

– – – Peripheral boundary

═══ Road

Tank bund

Water body (Tank)

Breached portion of the Tank

3.20. HOSAKEREHALLI RANGE

This range is located in the south-western side of the city and is bounded by Mysore and Kanakapura roads. The area of the range is approximately 30 sq.km. A total number of 37 viliages have been surveyed in this range and these are all listed below:

Subramanyapura, Vasanthapura, Pragathipura, Hosakerehally, Raghavendra Nagar, Kadirenahally, Giri Nagar, Radhakrishna Layout, Kathriguppa village, Padmanabha Nagar, Pantharapalya, Chanasandra, Srinivasapura, Gatagere, Halegevaderahally, Kodipalya, Gurubapalya, Gowdamapalya, Chamudipura, L.N. Pura, Gangondahally, Viswabharathi Complex, Kumaraswamy Lay out, Ramakrishna Nagar, Chikkakalasandra, Uttarahally, Anyanapura, Raghavendra Nagar (Srinagar), Avalahally (Vinobha Colony), Ongachandra, Muneeswara Nagar, Gangadara Nagar, Sarabandepalya, Chunchanaghatta, Vivekananda Nagar, Banasankari III Stage, Cauvery Nagar.

Breeding Habitats:

Various breeding habitats have been surveyed in this range and their measurements are presented in the Table 111.

TABLE 111

Measurements of the various breeding habitats in Hosakerehally Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	37	159
2.	Cesspools	31	5,770
3.	Wells	191	191
4.	Tanks	4	15,50,000
5.	Agricultural wet lands	—	1,50,00,000
6.	Drains:	68,351	34,175
	U-Drains	46,960	
	L-Drains	5,767	
	K-Drains	15,624	
7.	Storm water canals	8,000	8,000

Control:

a. *Tanks*:

Four tanks namely, Hosekerahally, Arehally, Utharahally and Gotigere are present in this range. Only Hosekerahally and Utharahally tanks have been found to receive sewage from Banasankari III stage drain and Itamedu kutcha canal respectively. Due to sewage connections, heavy growth of water hyacinth and moderate breeding of mosquitoes have been observed in these tanks.

Solutions:

1. Sewage connections should be diverted away from the tanks.
2. Water hyacinth should be completely removed and fish such as *Gambusia* should be released to prevent mosquito breeding.

b. *Storm water canals*:

b.1. *Banasankari III stage canal (2 km.)*:

This is a pucca canal which starts from Banasankari III stage and joins the Utharahally tank. Due to thick vegetation growth and silt accumulation, water is blocked at many places and heavy breeding of *Cx. quinquefasciatus* has been observed in the drain. In some places, garbage dumping from the nearby residences has also been noticed.

Solution:

1. Regular cleaning and desilting work should be carried out.

b.2. *Itamedu kutcha canal (3 km)*:

This kutcha canal starts from Chennamma tank (breached) area and runs through Itamedu to finally join with Hosakerahally tank. This canal has been blocked with thick growth of vegetation. Since this canal passes through fields, farmers are found to block the canal to irrigate their field with sewage water.

Solution:

This canal should be lined and till the completion of this work, regular deweeding should be carried out. The canal should be properly channelized.

b.3. *Bank Colony canal (3 km.)*:

This canal starts from Bank Colony area and passes through Papanna tank and joins the Hosekerahally outlet canal which runs to Vrishbhavathy valley. The whole length of the drain is unlined. Due to vegetation growth and heavy deposition of silt, water has been blocked in many places.

Solution:

This canal should be lined and pending this work, regular channelization should be carried out.

c. *Cesspits and Cesspools*:

There are overall 37 cesspits and 31 cesspools in the range. These habitats should be filled with silt removed from nearby drains while cleaning. As a temporary measure, these habitats should be sprayed with fenthion at the recommended dose of 1 ppm (Tables 112 and 113).

d. *Wells*:

A total number of 191 wells are present in the range. Most of them are in use and free from mosquito breeding. Breeding is however noticed in some unused wells. In unused wells breeding can be controlled by applying the expanded polystyrene beads at the rate of 500 g/m^2.

e. *Agricultural wetlands*:

In agricultural wetlands only very low breeding is found. However, the farmers should be suitably educated not to allow water stagnation to form pools for longer periods to avoid mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	9
2.	Cleaning/Deweeding		—	7
3.	Monitoring (Search and Evaluation)	—	11	—

WEEKLY SPRAY SCHEDULE FOR-HOSEKEREHALLY RANGE

MONDAY

Subramanyapura, Vasanthapura, Pragathipura, Hosekerehally, Raghavendra Nagar and Kadirenahalli.

TUESDAY

Girinagar, Radhakrishna layout, Kathriguppa village, Padmanabha Nagar, Pantharapalya and Channasandra.

WEDNESDAY

Srinivasapura, Gottigere, Halage Vaderahally, Kodipalya, Gurupapalya and Gaudana palya.

THURSDAY

Chamundipura, L.N. pura, Gangodahally (Lorry palya), Vishwabharathi Complex, Kumaraswamy layout and Ramakrishna Nagar.

FRIDAY

Chikka Kalsandra, Uttarahally, Anyanapura, Raghavendra Nagar (Srinagar), Avalahally (Vinobha Colony) and Ongachandra.

SATURDAY

Muneeswara Nagar, Gangadara nagar, Sarabande palya, Chun-Chanaghatta, Vivekanandanagar, Banasankari III Stage and Cauvery Nagar.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN HOSEKERAHALLY RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Gaudanapalya	100
Chamundipura — East side of village	50
" BDA Road	100
L.N.Pura — Anandaiyer Traders	80
" Kanagadas Layout	60
Gangondahalli 4th Cross Road	70
Vishwabharathi Complex — 4th Main Road	200
Kumarasamy Layout — III slum	125
Total length	785

TUESDAY – I & III Week

Locality	*Length (m)*
Kumaraswamy — Near BDA Park	100
" 3rd Main Road	100
" 5th Main	100
" 3rd Main — Latrine	100
" 5th Cross, Vittal Nagar	50
" 7th Cross "	25
" 9th Cross "	70
" 6th Cross "	10
" 3rd Cross, Public bath room	40
Uttarahally Appaiah Colony	20
Anjanapura Main Road	40
Raghavendra Nagar — Avallahalli Main Road	100
Avallahalli — Muneeswara Nagar — Opp. House No.1561/F	25
" Opp. Eswaraiah House	45
Total length	825

WEDNESDAY – I & III Week

Locality		*Length (m)*
Avallahalli —	Sri Manjunatha Coffee House	65
”	No.1497	60
”	No.1622	30
”	No.1625	80
”	No.1628	30
”	No.32/Z	30
”	Main Road	50
”	Vijayalakshmi Automobiles	15
”	No.47, Madhu Stores	100
”	A. Cheluvamma	175
Ongachandra	In front of Babu House	10
”	Main Road	300
	Total length	945

THURSDAY – I & III Week

Locality		*Length (m)*
Sarebandepalya —	Main	200
”	Side of Banasankari Temple	40
”	Harijans Colony	100
Chunchanaghatta		210
Cauvery Nagar		220
	Total length	770

FRIDAY – I & III Week

Locality		*Length (m)*
Cauvery Nagar		130
Subramanyapura —	Harijans Colony	25
”	Front of National High School	25
”	Gubbal Road	50
”	Side of Vasanthapura Main Road	100
Banasankari III Stage —	Kalidasa Nagar	500
	Total length	830

SATURDAY – I & III Week

Locality		*Length (m)*
Subramanyapura — KEB Quarters — Vasanthapur Road		100
Pragathipura slums — 5th Street		100
” 9th Street		100
” Umarbaugh layout		100
” Umarbaugh Layout — Main Road		25
Hosekerahalli Door No.663		100
” A.K. Colony Main drain BSK Layout		200
Raghavendra Nagar — Pipeline — Front of Sri Vindya Stores		45
” ” Ashok Kumar House		35
	Total length	805

MONDAY – II & IV Week

Locality		*Length (m)*
Raghavendra Nagar, Pipeline — Raghavendra Block — In front of House No.25		250
Raghavendra Nagar — Raghavendra Block No.13		250
” ” No.6		150
” ” 1st Cross		50
” ” Narayanasamy House		80
” ” Mallaiah House		70
	Total length	850

TUESDAY – II & IV Week

Locality		*Length (m)*
Kadirenahally — 100 Feet Road		300
” No.386, Lankappa		180
” No.695, K. village		75
” Krishnappa		50
” Govt. Primary School		50
” Munisamy House		25
Giri Nagar 4th Main		100
	Total length	780

WEDNESDAY – II & IV Week

Locality		*Length (m)*
Radhakrishna Layout —	1st Main	200
”	Near Gangadhar House	100
”	Near Swapna Food Products	100
Kathrikuppe village	Near Munisamy House	90
”	Kutcha drain	150
”	Near Govindachary House	150
	Total length	790

THURSDAY – II & IV Week

Locality	*Length (m)*
Padmanabha Nagar	300
Raghavendra Colony side of Door No.26	10
Panthrapalya — II and III Cross	700
Total length	1,010

FRIDAY – II & IV Week

Locality	*Length (m)*
Channasandra — Kengeri Main Road	300
Halage Vaddarahally — Kanchanahalli Main Road	600
Total length	900

SATURDAY – II & IV Week

Locality	*Length (m)*
Halage Vaddarahally — ‘A’ Main Road	300
” 2nd Cross	150
”	200
Total length	650

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C) ...	...	200 lit.
2.	M.L. Oil ...	...	800 lit.

Others:

Expanded Polystyrene Beads	...	...	50 kg.

Equipments Required:

1.	Spades ...	...	5 Nos.
2.	Bonds ...	...	5 Nos.
3.	Scrapers ...	...	5 Nos.

TABLE 112

List of Cesspools requiring filling work.

Locality	Length	Width	Surface area (m^2)
Gowdamapalya			
Dayananda College Opposite	25	25	625
Chamundipura			
East side of village	10	2	20
South of Chamundipura	10	2	20
Near to above	15	4	60
Entrance to Chamundipura	20	15	300
Near Durga Refreshments	30	30	900
L.N.pura			
Near Store	3	3	9
Kumarasamy Layout			
4th Main south side	25	10	250
East side of 4th Main	10	10	100
7th Cross 5th Main	25	10	250
8th Cross East side	25	10	250
Opp. Lakshmi Temple	25	25	625
6th Cross, Kumarasamy Layout	25	25	625
Ramakrishna Nagar (Jayanagar south)	10	3	30
Calcium Stores	10	4	40
Uttarahally Appaiah Colony	10	10	100
Ongachandra			
In front of Kepauna House	15	6	90
In front of Shamanna House	30	10	300
Banasankari III Stage			
Kalidasan Nagar	3	3	9
Coconut groove	4	5	20

Locality	Length	Width	Surface area (m^2)
Pragathipura			
Behind slums	3	5	15
West of Umerbagh Layout — 2nd Road last	15	15	225
3rd Road — Surya Industries	10	10	100
Near Perfect diesel works	10	10	100
Hosekerehally			
I Main Road, 4th Main	40	3	120
Raghavendra Nagar			
Nearby Hair Dressers	20	10	200
Near Pipeline	20	5	100
Kathiriguppa village			
Behind venkateswara house	10	5	50
Santhripti wines	15	10	150
Pantharapalya			
Railway lane	9	8	72
Gurubapalya	5	3	15

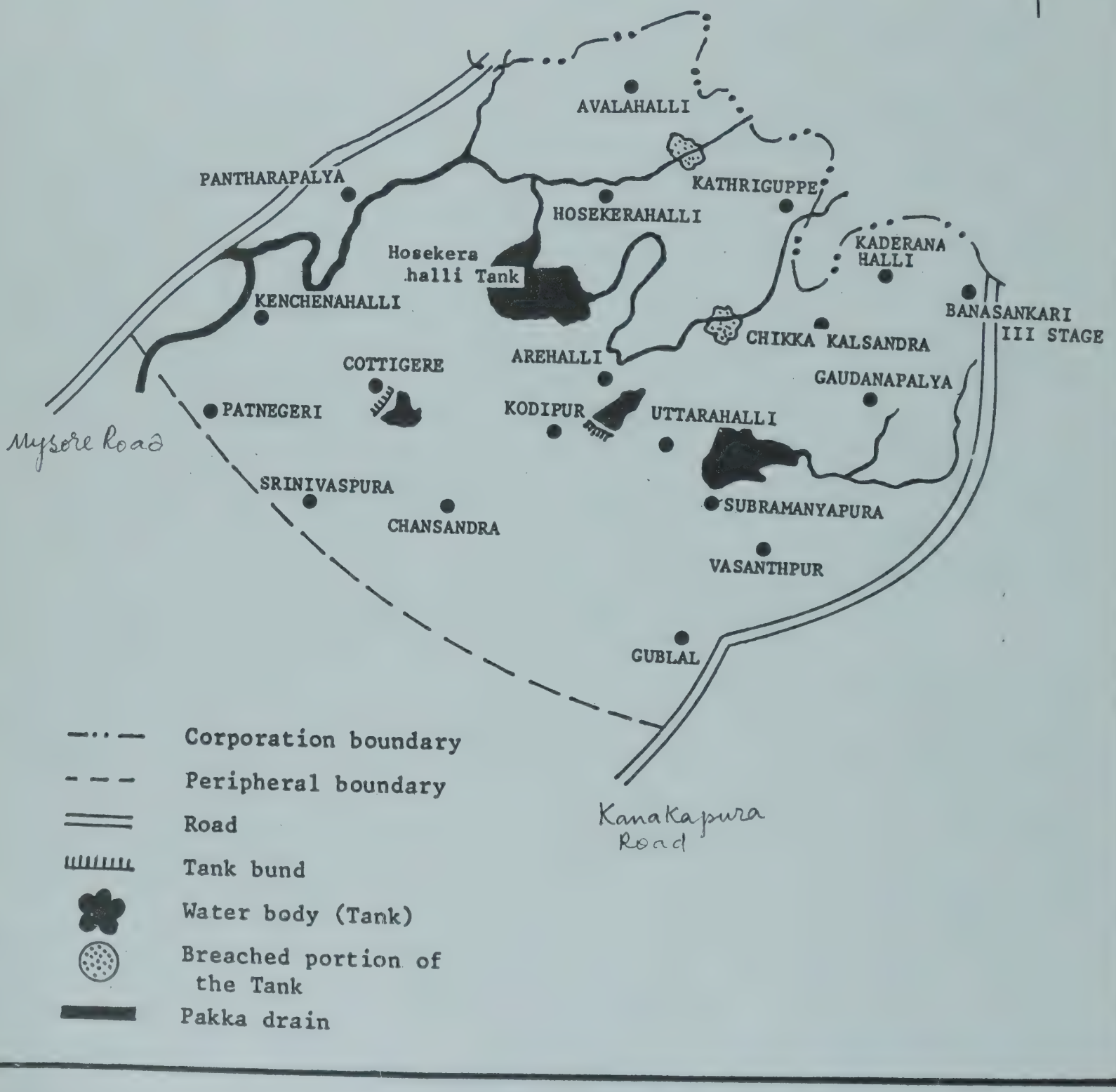
TABLE 113

List of Cesspits requiring regular spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Chamundipura			
South of Chamundipura	3	1	3
East of BDA side	5	1	5
East side of village	5	1	5
2nd Cross	1	1	1
Kumarasamy Layout			
2nd Main, Near BDA Park	5	1	5
7th Cross, Chandranagar slums	2	2	4
Chandranagar slums, 7th Cross	1	1	1
Ramakrishna Nagar			
In front of press	1.5	1.5	2.25
Chikkakalasandra			
I Main Road, Near Tyre Works	1.5	1.5	2.25
Anjanapura			
Muniyappa House	2	1.5	3
Raghavendranagar			
Dr. Rajkaund Singh	1.5	1	1.5
Avalahally Chikkana House	3	2	6

Locality	Length	Width	Surface area (m^2)
Avalahally, Muneeswer Nagar			
Front of C. Narayanappa House	3	2	6
Front of Rudrappa Store	2	2	4
Sarabandepalya			
Arumugam huts	2	1.5	3
Near Kumar Bar	1	1	1
Vivekananda Nagar			
Near Nanjappa House	3	3	9
Banasankari III Stage			
Kalidasan Nagar	1	1	1
Kalidasan Nagar	1	1	1
Near Coconut groove	1	1	1
Vasanthapura			
Near Temple	5	3	15
Near Choultry	1	1	1
”	2	1	2
”	3	1	3
Inside Choultry	5	1	5
”	3	1	3
Pragathipura slums			
6th Street	3	4	12
2nd Road	1	1	1
2nd Road Last point	1	1	1
Raghavendra Nagar pipeline	5	2	10
”	5	3	15
”	5	2	10
Kathrikuppa village			
Opposite No.48	1	1	1
Arjun Raj House	1	1	1
Lakshmanappa	1	1	1
Srinivasapura			
I Lane	1	1	1
Kalidasan Nagar			
Near Thippiah House	2	1	2

HOSEKERAHALLI



3.21. NAGARBHAVI RANGE

This range is situated in the western side of the city and is bounded by Mysore and Magadi roads. The range covers an area of about 30 Sq.Km. A total number of 11 villages have been surveyed in this range and the villages are given below.

Moodalapalya, Nayandahally, Kangeri, Nagarbhavi, Gangondanahally, Gnanabharathy Complex, Gnanabharathi Staff Quarters, Kottigepalya, Pappu reddy palya, Malathahally and Malagalu.

Breeding Habitats:

A number of breeding habitats have been surveyed in these villages and their measurements are summarised in the table 114.

TABLE 114

Measurements of the breeding habitats in the Nagarbhavi range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	11	20
2.	Cesspools	7	285
3.	Wells	12	12
4.	Agricultural wetlands	—	1,50,00,000
5.	Tanks	3	9,00,000
6.	Drains	15,365	7,683
	(i) U-Drains	9,660	
	(ii) L-Drains	1,550	
	(iii) K-Drains	4,155	
7.	Storm water canal	10,000	10,000

Control:

a. *Tanks*:

There are three tanks in the range namely, Kengeri tank, Lorrypalya tank and Nayandahally tank. Out of these three tanks, only Kengeri tank is a problematic tank while other tanks are free from sewage connection and water hyacinth. Kengeri tank is fully covered with water hyacinth. This also receivers sewage water from Vrishbhavathy valley drains and Uppu Nagar small drains. Moderate breeding has been observed in Kengeri tank throughout the year.

Solutions:

1. Sewage connections should be diverted away from the tank.
2. Water hyacinth should be removed and the tank should be maintained so as to avoid water hyacinth reinvasion.
3. Pisciculture should be initiated by the Fisheries Department once the tank is free from pollution.

b. *Storm water canals*:

There is only one major kutcha canal namely Peenya canal (6 Km.) in this range. This starts from Peenya 1st and 2nd stage and after passing through Income Tax layout, Singapore layout, Kamala Nagar, Sajjepalya, Nagarbhavi, Malegalu, and Gnanabharathi campus it finally runs in the Vrishbhavathy valley.

Water hyacinth and thick vegetation along the sides are found in the canal which blocks the free flow of water. As a consequence, water has been stagnated at many points leading to heavy breeding of *Culex quinquefasciatus*.

Solution:

This canal should be lined and pending this, regular channelization and cleaning work should be carried out.

c. *Cesspits and cesspools*:

There are 11 cesspits and 7 cesspools in this range. Heavy breeding is found in these habitats. Since these habitats receive sewage and sullage from the surrounding residential colonies, *Cx. quinquefasciatus* breeds heavily. These breeding habitats should be filled up as a permanent control measure. Until this work is completed, spraying should be done with fenthion at 1 ppm. The concerned departments like BDA, BWSSB and PWD should make proper drainage system in this range to avoid water stagnation (Tables 115 and 116).

d. Wells:

There are 12 wells in the range and all are in use. In future, if mosquito breeding occurs in these wells, larvivorous fish such as *Gambusia* or *Tilapia* should be released.

e. *Agricultural wetlands*:

Since the wetlands receive relatively unpolluted water from tanks, there is no breeding of *Cx. quinquefasciatus*. But *Anopheles* breeding is observed in few pockets. Agriculturists should be persuaded not to allow water stagnation to form pools for longer periods to avoid mosquito breedings.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	3
2.	Cleaning/Deweeding		—	5
3.	Monitoring (Search and Evaluation)	—	11	—

WEEKLY SPRAY SCHEDULE FOR NAGARBHAVI RANGE

MONDAY

Moodalapalya

TUESDAY

Nayandahally and Kengeri

WEDNESDAY

Nagarbhavi and Kotigepalya

THURSDAY

Gangondanahally (Lorry palya) and Pappu Reddy Palya

FRIDAY

Malathahally and Malagelu.

SATURDAY

Gnanabharathi Complex and Gnanabharathi Staff Quarters.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN NAGARBHAVI RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Kengeri — Hanuman Temple Road — side of RR wares	100
Gangondanahally (Lorry Palya) — 1st to 4th Cross	250
” — 2nd Main	200
” — 1st to 3rd Lane	100
” — 1st Main 14th Cross	100
Total length	750

TUESDAY – I & III Week

Locality	*Length (m)*
Gangondanahally (Lorry Palya) — 1st Main, 16th Cross	50
” — 1st Main 17th Cross	100
” — 2nd Main	150
” — 3rd Main, 17th Cross	150
” — 3rd Main, 18th Cross	50
Pappu Reddy Palya — 1st Main	80
Pappu Reddy Palya — 2nd Main	100
Malagalu 1st and 2nd Main	100
Total length	780

WEDNESDAY – I & III Week

Locality	*Length (m)*
Malagalu — 3rd Main	100
” — 4th Main	300
Kottigepalya — 1st Street	100
” — 2nd Street	100
” — 3rd Street	100
Total length	700

THURSDAY – I & III Week

Locality	*Length (m)*
Malathahally — 1st Main	400
" — 1st Cross	400
Total length	800

FRIDAY – I & III Week

Locality	*Length (m)*
Malathahally — 1st Lane	300
" — 2nd Lane	300
" — 3rd Lane	200
Total length	800

SATURDAY – I & III Week

Locality	*Length (m)*
Malathahally — 4th Lane	100
" — 5th Lane	200
" — 2nd Main Road	200
Total length	500

MONDAY – II & IV Week

Locality	*Length (m)*
Nagarbhavi — 1st Main Road	400
" — 1st Cross	200
" — 2nd Cross	200
Total length	800

TUESDAY – II & IV Week

Locality		*Length (m)*
Nagarbhavi — 3rd Cross		200
" — 2nd Main Road		600
	Total length	800

WEDNESDAY – II & IV Week

Locality		*Length (m)*
Nagarbhavi — 2nd Main 1st Cross		200
" — 2nd Main 2nd Cross		500
	Total length	700

THURSDAY – II & IV Week

Locality		*Length (m)*
Nagarbhavi — 2nd Main 3rd Cross		500
" — A.K. (Adhi Karnataka) Colony 1st Cross		300
	Total length	800

FRIDAY – II & IV Week

Locality		*Length (m)*
Nagarbhavi — A.K. Colony — 2nd Cross		300
Nagarbhavi — A.K. Colony — 3rd Cross		600
	Total length	900

SATURDAY – II & IV Week

Locality	*Length (m)*
Nayandahally — 1st Main Road	100
" — 2nd Main Road	50
" — 2nd Main Road, 1st Cross	100
Moodalapalya — Opp. to Hotel Sri Durga	150
" — Raja Bakery Road	100
" — KVN English School	50
Total length	550

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	50 Lit.
2.	M.L. Oil	...	...	200 Lit.

Others:

Expanded Polystyrene Beads	...	...	25 Kg.

Equipments Required:

1.	Spades	...	...	2 Nos.
2.	Bonds	...	...	2 Nos.
3.	Scrappers	...	...	2 Nos.

TABLE 115

List of cesspools requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Moodalapalya:			
Near Moodalapalya Main Road	10	5	50
	10	3	30
Nagarbhavi:			
I Cross	2	3	6
Gangondanahally:			
V Lane	3	3	9
II Main	5	5	25
3rd Main	5	3	15
Malathahally:			
V Lane	15	10	150

TABLE 116

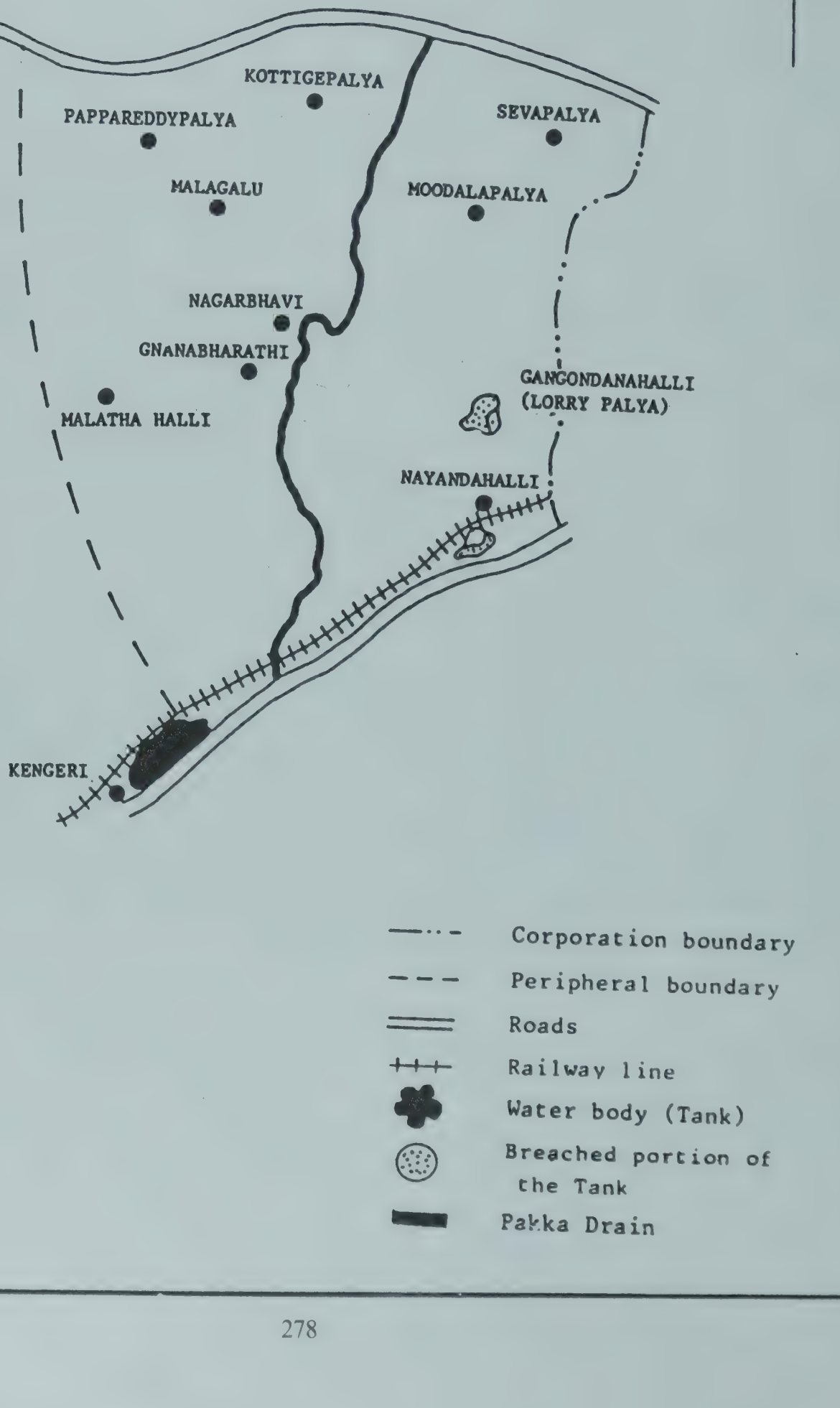
List of Cesspits requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Nagarbhavi:			
1st Cross	2	1	2
Gangondanahally:			
III Lane	1	1	1
IV Lane	1	1	1
”	1	1	1
V Lane	1	1	1
II Main	1	1	1
”	1	1	1
”	1	1	1
17th Cross, I Main	3	3	9

“The ramification of the organized life of a great city spread far beyond the factory and covers every aspect of existence. One consequence of importance is the extent to which the increase of organization has brought into existence new position of responsibility and power. Russell refers to this ‘Tyranny of Officials’ as being one of the worst result of increasing organization and one against which it is of the utmost importance to find safeguard in a scientific society. If not, society will be intolerable to all but an insolent aristocracy of Jacks-in-Office”.

—BERTRAND RUSSELL

NAGARBHAVI


KOTTIGEPALYA
PAPPAREDDYPALYA
SEVAPALYA
MALAGALU
MOODALAPALYA
NAGARBHAVI
GNaNABHARATHI
GANGONDANAHALLI
(LORRY PALYA)
MALATHA HALLI
NAYANDAHALLI
KENGERI
Corporation boundary
Peripheral boundary
Roads
Railway line
Water body (Tank)
Breached portion of the Tank
Pakka Drain

3.22. PEENYA RANGE

This range is situated in the western side of the city and is bounded by the Magadi and Tumkur roads. The range covers an area of about 30 Sq.km. A total number of 15 villages have been surveyed in this range and these villages are listed below:

Kurubarahally, Peenya village, Peenya third stage, Kamakshipalya, Peenya Chokkasandra, Peenya First stage, Peenya second stage, Shivapura, Sunkadakatte, Laggeri, Haggenahally, Seneguranahally, Chikka Bidaragal, Cauveripura and Singapore layout.

Breeding Habitats:

A number of breeding habitals have been surveyed in these villages and their measurements are summarised in the Table 117.

TABLE 117

Measurements of the breeding habitats in the Peenya Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	14	24
2.	Cesspools	7	1,455
3.	Wells	42	42
4.	Agricultural wetlands	—	1,00,00,000
5.	Tanks	3	2,00,000
6.	Drains:	30,045	15,020
	U-Drains	20,260	
	L-Drains	1,195	
	K-Drains	8,590	
7.	Storm water canals	4,000	4,000

Control:

a. *Tanks*:

There are three tanks in this range namely Kamakshipalya tank, T. Dasarahally tank and Chikka Bidaragal tanks. Out of these tanks Kamakshipalya tank is problematic tank, found fully covered with water hyacinth. It also receives sewage from the surrounding residential areas. Because of the pollution, *Culex quinquefasciatus* breeds very heavily in the tank.

Solutions:

1. Sewage connections should be avoided.
2. Larvivorous fish should be released in the tank after the removal of water hyacinth.

b. *Storm water canal*:

There is one major kutcha canal namely Peenya canal (4 km.) in this range. This canal starts from Peenya first stage and after passing through Peenya 2nd stage, Income tax layout and Singapore layout, it runs in Nagarbhavi range and finally joins the Vrishbhavathy valley. In some places the canal has been blocked due to water hyacinth and vegetation growth. Because of this, heavy breeding has been observed.

Solution:

Since it is a major canal in the range, it should be lined and pending this work, regular channelization and cleaning work should be carried out.

c. *Cesspits* and *Cesspools*:

There are 14 cesspits and 7 cesspools in this range. These habitats collect sewage and sullage from the surrounding residential colonies due to lack of proper drainage system. These habitats should be filled up with silt removed from the

drains as a permanent measure. The concerned authorities like BWSSB, PWD and BDA should make immediate arrangement for proper drainage system. (Tables 118 and 119.)

d. *Wells*:

There are altogether 47 wells in the range. Mosquito breeding has been observed in only few wells. Breeding in the potable wells can be prevented by releasing fish such as *Gambusia* and *Tilapia*. The unused wells should be either closed or properly covered with slabs to avoid mosquito breeding. Mosquito breeding could also be prevented by applying the expanded polystyrene beads at the rate of 500 g/m^2 in the unused wells.

e. *Agricultural wet lands*:

The wet lands have been irrigated mostly by unpolluted water from wells and tanks. However, agriculturists should be educated to avoid water stagnation forming pools for longer periods to prevent mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	5
2.	Cleaning/Deweeding		—	7
3.	Monitoring (Search and Evaluation)	—	11	—

SPRAY SCHEDULE FOR PEENYA RANGE

MONDAY

Kurubarahally, Peenya village, Peenya third stage.

TUESDAY

Kamakshipalya, Peenya Chakkasandra, Peenya first stage.

WEDNESDAY

Peenya second stage, Shivapura, Sunkadakatte.

THURSDAY

Laggeri, Megganahally.

FRIDAY

Seneguranahally, Chikka Bidaragal.

SATURDAY

Cauveripura, Singapore Layout.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN PEENYA RANGE

MONDAY – I & III Week

Locality		*Length (m)*
PEENYA CHOKKASANDRA	— Inside the village	200
”	Opp. Door No.739	50
”	Opp. Door No.742	30
”	Opp. Door No.732	60
”	Opp. Door No.702	50
”	Opp. Door No.410	80
	100 feet road side	150
	Total length	620

TUESDAY – I & III Week

Locality		*Length (m)*
PEENYA VILLAGE	— Near Manjunatha & Sons	500
”	Opp. Door No.488	50
”	Opp. Door No.508 and 515	65
”	Near S.K.S. Enterprises	50
”	Navathurga Stores	75
”	Near No.117 Arrack Shop	100
	Total length	840

WEDNESDAY – I & III Week

Locality		*Length (m)*
PEENYA VILLAGE	— Circle Bore Office	50
”	No.217	100
”	No.247	50
”	No.216	100
PEENYA SRS ROAD	SRS Main Road	400
”	Door No.784/1	20
”	Door No.793	25
”	Door No.827	40
”	Govt. Jr. College Road	100
”	College Road No.753	25
	Total length	910

THURSDAY – I & III Week

Locality		*Length (m)*
Kurubarahally —	No.24, II Main, Narasaiah	25
Peenya 3rd Stage —	11th Main Road	300
” —	Opp. Rubber Industries	100
” —	60 feet Road Cross	150
Cauverypura —	Opp. Rafee Ahmed House	75
” —	Vijayanagar Coffee Bar	150
	Total length	800

FRIDAY – I & III Week

Locality		*Length (m)*
Kamakshipalya —	Main Road — 1st Cross	400
”	” 2nd Cross	400
	Total length	800

SATURDAY – I & III Week

Locality		*Length (m)*
KAMAKSHIPALYA —	Nayandeswara Stores	250
”	Kamatchi Stores	250
”	Parameswari Clinic	200
”	Opp. Nayandappa House	50
”	3rd Main Road	75
”	Near by LSDE	100
	Total length	925

MONDAY – II & IV Week

Locality	*Length (m)*
KAMAKSHIPALYA — 3rd Main Road	160
" Sun Star Carpenters Cauverypura	300
" Vanamahalakshmi House	200
TUMKUR—PEENYA ROAD — Peenya Sports Club	25
" No.743	15
" No.697/1	25
" No.730 and 710	100
" Lakshmi Electrical Industries	50
Total length	875

TUESDAY – II & IV Week

Locality	*Length (m)*
Tumkur Peenya Road — Krishna Lubrication Ltd.	500
Shivapura — 4th lane	150
Laggeri — Main Street	200
Total length	850

WEDNESDAY – II & IV Week

Locality	*Length (m)*
Peenya I Stage — 1st Lane	500
" 2nd Lane	500
Total length	1,000

THURSDAY – II & IV Week

Locality	*Length (m)*
Peenya II Stage — 1st Lane	500
" 2nd Lane	500
Total length	1,000

FRIDAY – II & IV Week

Locality		*Length (m)*
Chikka Bidaragal	— 1st Main Road — Manjunatha Flour Mill	300
”	1st Main Road — 1st to 3rd Cross	300
”	2nd Main	100
	Total length	700

SATURDAY – II & IV Week

Locality		*Length (m)*
Chikka Bidaragal	— 3rd Main	200
”	3rd Main Road — 1st Cross	200
”	Tumkur Main Road	500
	Total length	900

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	125 lit.
2.	ML Oil	...	...	500 lit.

Others:

Expanded Polystyrene beads	...	...	25 kg.

Equipments Required:

1.	Scrapers	...	...	5 Nos.
2.	Spades	...	...	5 Nos.
3.	Bonds	...	...	5 Nos.

TABLE 118

List of Cesspools requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Peenya III Stage			
Left side of 11th Main Road	60	10	600
N. Vikram Laboratory	80	10	800
Laggeri:			
Side of the temple	3	4	12
Peenya III Stage			
Back side of Mysore Engineering Works	5	3	15
Kamakshipalya:			
End of 4th Main Road	5	2	10
" — Left side	4	2	8
Peenya Village			
Door No.783/1	5	2	10

TABLE 119

List of Cesspits requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Peenya III Stage			
60 feet Road, Cross	2	1	2
Kamakshipura			
II Cross	1	1	1
Opp. Plastic Industries	2	1	2
Manjunatha House	2	2	4
Javaraiah House	1.5	1	1.5
"	1	1	1
6th Main Road, Left side	2	1	2
Peenya village			
No.648	2	2	4
No.286	1	1	1
Door No.809	1	1	1
Tool Craft nearby	1.5	1	1.5
Opp. to above	1	1	1
Side of above	1	1	1
2nd Cross	1	1	1

PEENYA

Corporation boundary

Peripheral boundary

Road

Tank bund

Water body (Tank)

Pakka drain

3.23. HMT RANGE

This range is situated in the north-eastern side of the city and is bounded by Tumkur road and HMT road. The range covers an area of about 30 Sq.Km. A total number of 18 villages have been surveyed in this range and these villages are listed below:

Devinagar, Devappa layout (Jalahally east), Bandappa nagar, Jalahally, Jalahally — MES Road, Babubali Nagar, Komagondanahally, Jalahally West, HMT Quarters, Katha Nagar, Tumkur road Dasarahally, Mallasandra, Bagalakunde, Thotada Guttedahally, Manjunatha Nagar, Chikksandra, Chikka Banavara, Settihally.

Breeding Habitats:

A number of breeding habitats have been surveyed in these villages and their measurements are summarised in the Table 120.

TABLE 120

Measurements of the various breeding habitats in the HMT Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	56	139
2.	Cesspools	23	2,917
3.	Wells	183	183
4.	Agricultural Wetlands	—	1,50,00,000
5.	Tanks	2	3,00,000
6.	Drains:	32,990	16,495
	(i) U-Drains	23,505	
	(ii) L-Drains	895	
	(iii) K-Drains	8,590	

Control:

a. *Tanks*:

There are two tanks in this range namely, Chikka Banavara and Dodda Guddadahally Tanks. Both tanks are free from sewage connection and collect only rainwater. No mosquito breeding has been found in these tanks.

b. *Cesspits and Cesspools*:

There are altogether 56 cesspits and 23 cesspools found in this range. Most of these habitats have been found with heavy breeding of *Culex quinquefasciatus*. These habitats should be filled up as a permanent control measure. Until this work is completed, spraying should be done with fenthion at the rate of 1 ppm. (Tables 121 and 122.)

c Wells:

There are 183 wells in this range and most of them are in use. Breeding in the potable unused wells can be prevented by releasing fish such as *Gambusia* or *Tilapia* or by the application of expanded polystyrene beads at the rate of 500 g/m^2.

d. *Agricultural wetlands*:

The wetlands receive relatively unpolluted water from tanks and wells for irrigation. Breeding has been observed in very few pockets. However, agriculturists should be educated not to allow stagnation of water for longer periods to avoid mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required* Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	3
2.	Cleaning/Deweeding		—	7
3.	Monitoring (Search and Evaluation)	—	11	—

SPRAY SCHEDULE FOR HMT RANGE

MONDAY

Devi Nagar, Devappa Layout (Jalahally East), Bandappa Nagar.

TUESDAY

Jalahally, Jalahally — MKS Road, Babubali Nagar.

WEDNESDAY

Kamagondanahally, Jalahally West, HMT Quarters.

THURSDAY

Katha Nagar, Tumkur Road Dasarahally, Mallasandra.

FRIDAY

Bagalkunde, Thotada Guttedahally, Manjunatha Nagar.

SATURDAY

Chikkasandra, Chikka Banavara and Settilhally.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN HMT RANGE

MONDAY – I & III Week

Locality	*Length (m)*
Jalahally — Village	225
" — Bandappa Nagar	50
" — Village K-drain	150
" — M.E.S Road, K.N.Engineers	150
" — Yadhukula Printers	200
" — Near Door No.87	30
" — Bhahubalinagar	100
Total length	905

TUESDAY – I & III Week

Locality	*Length (m)*
Jalahally — Opp. House No.251/A	20
" — Opp. House No.299	100
" — V.P. Road Opp. House No.267	50
" — Opp. House No.196/8 & 192/4 (R.V. Temple Road)	100
Kamagondanahally — Opp. Kendriya Vidyalaya	150
" — Main Canal	500
Total length	920

WEDNESDAY – I & III Week

Locality	*Length (m)*
Kamagondanahally — Abbigere Main Road	100
" — Near Wood works	100
" — 1st Main Road (Jalahally)	250
" — Near S.D.A.High School	60
T. Dasarahally — Opp. House No.183/1, 57/1 and 300/4	100
— Village, Opp. House No.100 (Rajanna)	80
— Village, Opp. House No.15, 431/1 & 772	180
Total length	870

THURSDAY – I & III Week

Locality		*Length (m)*
T. Dasarahally	— Opp. Gangatharan House	50
”	— Main Road, near SRK Company	300
”	— Main Road, II Cross	100
”	— Nethaji Nagar, Near Door No.500	100
”	— Nethaji Nagar Slum side	200
”	— Opp. Door No.1332 & 1333	130
	Total length	880

FRIDAY – I & III Week

Locality		*Length (m)*
T. Dasarahally	— Near House No.780/4	50
”	— Near House No.817 and 843	200
”	— Near House No.849 and 1282	250
”	— Near Abhiman Stores	100
”	Back side of House No.87	100
Kamagondanahally	— S.S. Engineering	100
Dodda Guddadahally		80
	Total length	880

SATURDAY – I & III Week

Locality		*Length (m)*
Manjunatha Nagar	— 1st Main Road	300
”	— 2nd Lane and 1st Lane	300
”	— 3rd Lane, 4th Lane and 5th Lane	300
	Total length	900

MONDAY – II & IV Week

Locality		*Length (m)*
Bagalekunte — 1st Main Road		400
" — 1st, 2nd and 3rd Lanes		400
	Total length	800

TUESDAY – II & IV Week

Locality		*Length (m)*
Bagalekunte — 4th, 5th and 6th Lanes		300
H.M.T Quarters — No. W/756 Bridge		10
" — No. W/696 Bridge		10
T. Dasarahalli — No.11, Dynamic Hydraulics		100
— Opp. ABY Industries		100
— Near House No.1907/4		50
— 2nd Cross and 3rd Cross		200
— 4th Cross		100
	Total length	870

WEDNESDAY – II & IV Week

Locality		*Length (m)*
T. Dasarahally — Nearhouse No.491 and 726		100
" — Near House No.721		100
" — Main Road side		300
Chikka Sandra — 3rd and 4th Street		160
" — 5th Street		50
" — 8th Street		75
" — 9th Street		50
	Total length	835

THURSDAY – II & IV Week

Locality		*Length (m)*
Chikka Sandra — 7th Street		300
Chikka Banavara — 1st Street		400
" — 2nd Street		200
	Total length	900

FRIDAY – II & IV Week

Locality		*Length (m)*
Chikka Banavara — 5th Street		400
" — 2nd, 3rd and 4th Street		130
Settihally — 1st and 2nd Streets		120
Mallasandra — 1st Main		300
	Total length	950

SATURDAY – II & IV Week

Locality		*Length (m)*
Mallasandra — 1st Main, 1st Cross		200
" — 2nd Main		300
" — 2nd Main, 1st Cross		200
" — 3rd Main		400
	Total length	1,100

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	50 Lit.
2.	M.L. Oil	...	...	200 Lit.

Others:

Expanded Polystyrene beads	...	...	50 Kg.

Equipments Required

1.	Scrappers	...	...	5 Nos.
2.	Spades	...	...	5 Nos.
3.	Bonds	...	...	5 Nos.

TABLE 121

List of cesspools requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Bandappa Nagar (Revenue sites)	5	5	25
Side of BEL factory	3.5	3.5	12.25
,,	10	12	120
Ramaiah shop (Devinagar)	10	10	100
Main Road	25	25	625
Jalahally East No.36, Govindappa	15	10	150
Near Railway Tract	15	5	75
Bhabhubalinagar:			
Door No.348 Right side	15	5	75
Door No.25	5	3	15
Kamagondanahally: (Jalahally West)			
South K.G. hally slums backside	15	7	105
,,	20	10	200
,,	10	5	50
,,	5	2	10
Bagalekunte:			
V Lane	5	10	50
HMT Quarters			
Near H.M.T Sewage tank	10	2	20
Tumkur Road Dasarahally:			
Peenya Road Near T. Dasarahally	10	3	30
No.984/2 ,,	10	5	50
No.110 ,,	6	4	24
No.100 ,,	8	2	16
Opposite Gangadharan house	10	8	80
No.1332, Prakash house	5	15	75
Jalahally:			
Near Mangaiah house	5	2	10

TABLE 122

List of cesspits requiring spraying till the completion of filling work.

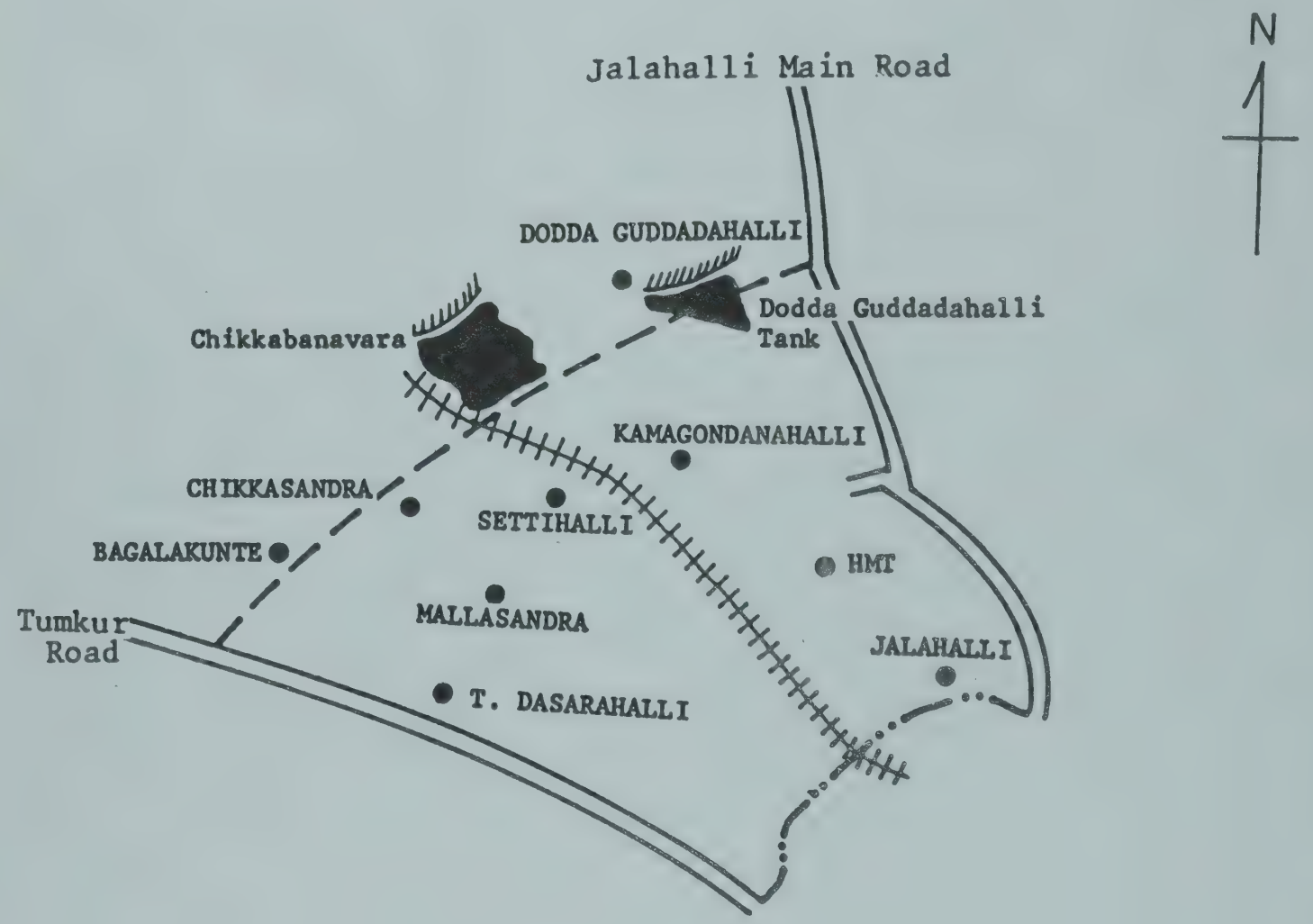
Locality	Length	Width	Surface area (m^2)
Jalahally:			
30, Matan house (backside)	1	1	1
Jalahally — M.E.S Road			
Door No.134	5	1	5
Door No.5/C	2	1	2
Door No.60	5	1	5
Babhubalinagar:			
Door No.371	3	1	3
Kamagondanahally:			
Front Teeno Gross Company	1	1	1
Bagipet slums	4	2	8
Left side	3	2	6
Right side	3	2	6
Manjunatha nagar:			
I Main, Entrance	1	1	1
V Lane	1	1	1
”	1	5	5
Katha Nagar:			
Left side Rangan house	1	1	1
” Gopal house	2	2	4
Kumar house	1	1	1
No. 676	1	1	1
Bandappa nagar	3	2	6
Revenue sites	1	1	1
Side of BEL Factory	1	1.5	1.5
”	1	1	1
”	2	1.5	3
”	1	1	1
”	1	1	1
”	2	2	4
”	3	2.5	7.5
”	2.5	2	5
”	1	1	1
”	1.5	1.5	2.25
”	2	1.5	3
	2	2	4
Devappa Layout:			
Jairaj house	2	1	2
Ramachandrapura village Door No.66	2	1	2
Bandappa nagar (Jalahally):			
Muniyappa house	1	1	1
Devaiah house	2	1	2

Locality	Length	Width	Surface area (m^2)
Jalahally village:			
Kamat house	1	1	1
”	0.5	0.5	0.25
House No.167/2	2	1	2
”	1	1	1
Pandappa Garden	2	2	4
Katha Nagar Slum:			
	1	1	1
	0.5	0.5	0.25
	0.5	0.5	0.25
	1	0.5	0.5
	1	1	1
	0.5	0.5	0.25
Tumkur Road Dasarahally:			
No.958	0.5	0.5	0.25
No.981	0.5	0.5	0.25
Near by Gangadhara house	1	1	1
No.317 ”	2	2	4
No.838 ”	5	1	5
No.854 ”	10	0.5	5
No.823 ”	1	1	1
Near 842 ”	2	2	4
Opp. Balaji House	1	1	1
”	1	1	1
Settihally:			
II Street	1	1	1
Chikkasandra:			
III Street	1	1	1

Optimum methods of pest control will involve careful integration of chemical, biological and cultural techniques. Only in this way, can the objective of economic control of pest in crops and animals be obtained with minimal environmental and ecological impact.

AMERICAN CHEMICAL SOCIETY, 1969.

HMT



—•••— Corporation boundary

— — — Peripheral boundary

Road

Railway line

Tank bund

Water body (Tank)

3.24. HEBBAL RANGE

This range is situated in the northern side of the city and is bounded by the HMT and Bellary roads. This range covers an area of about 30 Sq. km. Totally 12 villages have been surveyed in this range and these villages are listed below:

Byatarayanapura, Sanjeevininagar, Kodigehally, Bhoopasandra, Ramachandrapura, Doddabommasandra, Aswathanagar, Lottigollahally, Nagashettyhally, Greddalahally, Thindlu and Hebbal.

Breeding Habitats:

A number of breeding habitats have been surveyed in these villages and their description is summarized in the Table 123.

TABLE 123

Measurements of various habitats in the Hebbal Range.

Sl.No.	Type of breeding habitat	Length (m)/No.	Surface area (m^2)
1.	Cesspits	28	72
2.	Cesspools	23	4,267
3.	Wells	97	97
4.	Agricultural wetlands	—	1,50,00,000
5.	Tanks	2	10,00,000
6.	Drains:	39,745	19,873
	U-Drains	24,670	
	L-Drains	6,920	
	K-Drains	7,105	
	Box Drains	1,050	
7.	Quarry pits	6	1,700

Control:

a. *Tanks*:

There are two tanks in this range namely, Hebbal and Kodigehally tanks. Only Hebbal tank is problematic due to the sewage connection and heavy growth of water hyacinth. Hebbal tank receives sewage from Kodigehally kutcha drains and also Gokul kutcha drains. This tank has been polluted to that extent that the birds like egrets which were attracted by the area around the tank once have not been spotted in recent times.

Solutions:

1. Sewage connections to the tank should be diverted away from the tank.
2. The plan outlined by the Ecology and Natural Resources Unit of the Agricultural Science involving bulldozing of the tank bed during the dry months, scooping out the silt and putting screens at the entry points to prevent the growth of water hyacinth should be implemented with the help of PWD and other concerned departments. In addition, a constant vigil should be kept against the future invasion of the weed.

b. *Cesspits and Cesspools*:

There are 28 cesspits and 23 cesspools in this range. These habitats should be filled up as a permanent environment improvement. The PWD, BWSSB and BDA should arrange for proper underground sewerage connections in new layouts for the disposal of waste water and sullage to reduce the source for mosquito breeding in future. Until the completion of this work, these habitats should be sprayed with fenthion at the rate of 1 ppm. (Tables 124 and 125.)

c. *Wells*:

A total of 97 wells are found in this range.

Since most of the wells are in use, breeding is not found. However, breeding in few unused wells can be prevented by releasing fish such as *Gambusia* or *Tilapia* in potable wells and by the application of expanded polystyrene beads at the rate of 500 g/m^2 in polluted wells.

d. *Quarrypits*:

There are six quarry pits in this range. As a permanent measure these pits should be levelled up. However as a temporary measure, fish should be released in these pits for mosquito control. In polluted pits, fenthion should be sprayed at the rate of 1 ppm. (Table 126).

e. *Agricultural wetlands*:

The agricultural wetlands are irrigated by the Hebbal tank and other water sources. Agriculturists should be educated not to allow water stagnation as pools for longer periods to avoid mosquito breeding.

STAFF DEPLOYMENT:

Staff required for three major activities, *viz*., spraying, cleaning/deweeding and monitoring is given below.

	Activity	*Staff required*		
		Junior Health Inspector	Headgangmen	Gangmen
1.	Spraying	1	—	5
2.	Cleaning/Deweeding		—	12
3.	Monitoring (Search and Evaluation)	—	11	—

SPRAY SCHEDULE FOR THE HEBBAL RANGE

MONDAY

Byatarayanapura, Sanjeevini Nagar.

TUESDAY

Kodigehally, Bhoopasandra.

WEDNESDAY

Ramachandrapura, Doddabommasandra.

THURSDAY

Aswatha Nagar, Lottigollahally.

FRIDAY

Nagashettyhally, Geddalahally.

SATURDAY

Thindlu, Hebbal.

SCHEDULE FOR CLEANING AND DESILTING OF DRAINS IN HEBBAL RANGE

MONDAY – I & III Week

Locality		*Length (m)*
GEDDALAHALLY	— Near Jayamani Clinic	50
”	Near House No.179/2	25
”	Opp. to House No.23	20
NAGASETTIHALLY	— Busstand to Khodays Buildings	250
”	Main Road	50
”	In front of Sabari Bakery	200
”	A.K. Colony 1st and 2nd Roads	125
”	1st road near House No.13	50
”	Ex-Chairman Giddappa Road	50
”	Near Bus Stand	100
”	In front of Aruna Bar Temple Road	55
ASWATHANAGAR	— Near BDA Dollers layout	100
”	from BEL Road to Dollers layout	200
”	Near Ashoka Electricals	20
”	Opp. Pragati Industires to Vinayaka Radio Shop (Nos.66, 19, 126, 174 and 377)	230
DODDA BOMMASANDRA	— 1st Main Road	300
	Total length	1,825

TUESDAY – I & III Week

Locality		*Length (m)*
DODDA BOMMASANDRA	— 2nd Main Road, BEL Layout Road	500
”	Side of Venugopal Temple	160
”	Near Brahma Chaitanya Association	100
RAMACHANDRAPURA	Near Door No.14	100
BHOOPASANDRA	RMS Colony	60
”	Near Muslim Association & Mosque	250
”	Near Hebbal Main Road	150
”	Main Road	300
”	Near Seed Technology Compound	50
	Total length	1,670

WEDNESDAY – I & III Week

Locality		*Length (m)*
KODIGEHALLY —	From GKVK Stores	1,500
”	Pattamma Lane	150
”	Near Govt. Primary School	170
”	Pattamma Temple Street	400
	Total length	1,870

THURSDAY – I & III Week

Locality		*Length (m)*
KODIGEHALLY —	Raja Street Cross	300
”	Guru Narayanasamy Mutt Lane	300
”	Badramma Temple Street	300
”	Badramma Temple Lane	100
”	Towards Hebbal Tank	500
SANJEEVINI NAGAR —	1st Cross to 4th Cross	440
	Total length	1,940

FRIDAY – I & III Week

Locality		*Length (m)*
SANJEEVINI NAGAR —	End of Kodigehally Main Road	30
”	Near 9th Cross	50
THINDLU	Thindlu Main Street	50
”	1st Lane	50
”	2nd Lane	60
”	Harijans Colony	100
”	Harijans Colony 1st and 2nd Street	200
	Yelahanka Road	130
HEBBAL	Venkateswara Block 1st Cross	600
”	Venkateswara Block 2nd Cross	600
	Total length	1,870

SATURDAY – I & III Week

Locality			*Length (m)*
HEBBAL —	Venkateswara Block —	3rd Cross	600
”	”	4th Cross	500
”	”	5th Cross	500
”	”	6th Cross	500
		Total length	2,100

MONDAY – II & IV Week

Locality			*Length (m)*
HEBBAL —	Shivasankar Block —	1st Cross	300
”	”	Main Road	400
”	”	2nd Cross	400
”	”	Main Road, 1st Cross	400
”	”	3rd Cross	50
”	”	4th Cross	400
”	”	5th Cross	50
		Total length	2,000

TUESDAY – II & IV Week

Locality			*Length (m)*
HEBBAL —	A Block —	Main Road	500
”	”	1st Lane	150
”	”	2nd Lane	150
”	”	3rd Lane	200
”	”	1st Cross	50
”	”	2nd Cross	200
”	”	3rd Cross	250
”	”	2nd Main Left side	400
		Total length	1,900

WEDNESDAY – II & IV Week

Locality			*Length (m)*
HEBBAL — A Block —		2nd Main right side	400
”	”	1st Main Road (both sides)	1,000
”	”	1st Lane	150
”	”	1st Cross, right side	200
”	”	1st Cross, left side	200
		Total length	1,950

THURSDAY – II & IV Week

Locality		*Length (m)*
HEBBAL —	2nd Cross	400
”	3rd Cross	200
”	2nd Lane	30
”	2nd Main Road (both sides)	800
”	2nd Main 1st Cross	300
	Total length	1,750

FRIDAY – II & IV Week

Locality		*Length (m)*
HEBBAL —	2nd Cross	300
”	3rd Cross	400
”	3rd Main Road	300
”	Police Station Road	700
	Total length	1,700

SATURDAY – II & IV Week

Locality			*Length (m)*
HEBBAL — Police Station Road —		1st Cross	400
”	”	2nd Cross	400
”	”	3rd Cross	500
”	Bellary Road		600
		Total length	1,900

INSECTICIDE REQUIREMENT PER ANNUM:

1.	Fenthion (82.5% E.C)	...	...	100 lit.
2.	M.L. Oil	...	...	400 lit.

Others:

Expanded Polystyrene beads	...	...	50 kg.

Equipments Required:

1.	Scrapers	...	...	10 Nos.
2.	Spades	...	...	10 Nos.
3.	Bonds	...	...	10 Nos.

TABLE 124

List of Cesspools requiring spraying work till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Geddalahally:			
Srinivasa Engineering Works — 7th Street	5	2	10
Nagasettyhally			
Near D. Kempe Gowda House — Lakshmi Nilaya	15	10	150
Side of Khodays Factory Workers Slum Area	10	5	50
,,	10	5	50
,,	5	3	15
Near Bus Stand	5	5	25
,,	5	3	15
,,	5	2	10
,,	5	2	10
,,	5	2	10
In front of Venkateswarasamy Vidya Samithi	10	2	20
Near Rama Coffee Bar	10	4	40
Ashwatha Nagar:			
Side of Citizen Clinic	30	40	1200
Near BDA Dollers	5	5	25
Srivatsa No.8	10	5	50
Byataranayapura:			
Opp. to 295	7	6	42
Opp. to 302	6	2.5	15
Front of 57	10	4.5	45
Vinayaka English Nursery Primary School	15	10	150
Sanjeevini Nagar:	50	30	1500
Thindlu:			
Yelahanka Road	40	20	800
Ramachandrapura:			
Door No.14	5	2	10
Lakshmana Layout — A.K. Colony — 2nd Road	5	2	10

TABLE 125

List of Cesspits requiring spraying till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Geddalahally:			
Opp. to Engineering Works	2	1	2
,,	2	1	2
,,	1	1	1
Nagasettihally:			
Near Ashoka Electricals	1	1	1
Very near to above	1.5	1.5	2.25
Lakshmanamma Layout:			
Back side of House No.11	1	1	1
Opp. Krishnappa House	1	2	2
House No.170	1	4	4
Aswatha Nagar:			
M. Chinnappa House	1	1	1
Side of New Ashoka Electricals	1	1	1
Sugumu House	1	0.5	0.5
Sri Lakshmi Niwas	1	0.5	0.5
House No.89	1	1	1
House No.74	2	2.5	5
Plot No.64	1	1	1
House No.40	2	3	6
Srinivas & Co.	2	2	4
Hotel Gurukrupa	1.5	1.5	2.25
Dodda Bommasandra:			
I Main Road	1	1	1
,,	1	1	1
,,	1	1	1
Byatarayanapura:			
Open Fields	6.5	1	6.5
,,	4	1	4
,,	3.5	2	7
,,	1.5	1	1.5
	2	1.5	3
Kodigehally:			
Front side of Ramanna House	3	3	9
Thindlu			
II Street End	1	1	1

TABLE 126

List of Quarrypits requiring releasing of fish till the completion of filling work.

Locality	Length	Width	Surface area (m^2)
Sanjeevini Nagar:			
Near III Main	50	20	1000
"	20	10	200
Near IV Main	15	10	150
"	10	10	100
Near Anjaneya Temple	10	10	100
"	15	10	150

HEBBAL

N
Bellary Road
THINDULU
Kodigehalli
Tank
RAMACHANDRA
PURA
HMT Road
BYATRAYANAPURA
KODIGEHALLI
DODDA
BOMMASANDRA
SANJIVINI NAGAR
LOTTIGE HALLI
B E L
Hebbal Tank
NAGASETTIHALLI
HEBBAL
GEDDELAHALLI
ASWATHANAGAR
Corporation boundary
Peripheral boundary
Road
Railway line
Tank bund
Water body (Tank)

CHAPTER III

CONCLUSION

The problem of mosquito nuisance in Bangalore City is mainly due to *Culex quinquefasciatus*. This species is adapted so much to human association that it is popularly known as the domestic mosquito of the Tropics. High reproductive and dispersal potential of this species facilitated the successful exploitation of the environmental changes brought about by man in the process of urbanization. The unplanned and rapid growth of the Bangalore metropolitan city has created an undue strain in public services mainly due to the improper and indiscriminate disposal of solid and liquid waste which has led to a complete breakdown of the sanitory arrangement in the city. Various departments in the State which are responsible for developmental activities have not only failed to visualize the problem of growth in terms of quality and quantity but also in the implementation of the programme properly. As a consequence of the mismanagement of the environment by the various departments and citizens, enourmous number of breeding grounds of different shapes and sizes have been created.

The enormity of the problem can not be tackled in a cost effective manner by use of insecticides alone, as it is evident from the fact that the Bangalore mosquito control project has been spending over Rupees ten million every year without any result. Since the problem is mainly due to gross mismanagement of the environment, only environmental improvement can provide a permanent solution. However, this is a long term process and needs concerted effort from all departments.

It is a wrong notion that the health department alone is responsible for controlling the mosquito menace as the problem is compounded by the action or inaction of agencies like BDA, BWSSB and PWD as well as the inhabitants of the city. Therefore intersectoral collaboration and community participation have to play a major role in controling mosquitoes. The intersectoral collaboration can not be achieved by forming commitees which rarely meet to take any constructive decision. The heads of the three important departments (BWSSB, BDA, BCC) which can play a positive role in mosquito control are of the same rank and these status conscious officials fail to take a common decision because of the power conflict. *Therefore a central authority should be identified and empowered to coordinate the activity of these departments which are presently working in isolation.* The central authority should be a person above the rank of the chiefs of the above mentioned departments. If this arrangement is made with political will and managerial skill there is no doubt why mosquito control can not be achieved. Community participation should be achieved not only by health education and motivation but also by enforcing strictly the penal provisions in the Public health Act. Copies of the "Singapore Destruction of Disease Bearing Insects Act" have already been supplied to the Corporation Health Officer as a model.

It is found that the manpower available for implementing the programme is more than adequate. An additional eight posts of Entomological Assistants have been proposed to increase the technical competence of the mosquito control organisation. The Entomological Assistants should preferably have a M.Sc. Degree in Medical Entomology. The Entomological Assistants will be responsible for evaluation and analysis of data and suitably modifying the programme in consultation with the Biologist. The Biologist should be a vector control specialist with considerable experience and knowledge of the bionomics of mosquitoes. He should ensure that adequate facilities for collecting mosquitoes are provided to the insect collectors. While the Medical Officer of Health (MC) is responsible for the control operation, the Biologist is responsible for the evaluation and will report simultaneously to the MOH (MC) and Health Officer of Corporation. Since all the operational staff are under MOH (MC), the primary responsibility for any increased mosquito nuisance should be his.

Each Entomological Assistant should monitor the adult density from three ranges by collecting mosquitoes from fixed and random catching stations. A total of 32 insect collectors should assist the eight Entomological Assistants in this task. Filling up of these posts and training will make BMCP selfreliant in planning, implementing and evaluating the programme. While each Senior Health inspector will be incharge of three ranges he will be assisted by Junior health inspectors who will act as a link between him and the field workers. Senior health inspectors will procure the materials including insecticides and equipments as well as distribute them in the field through the Junior health inspectors. They should also maintain the records of day to day work. The Senior Health Inspector should periodically (at least once in a week) report, discuss and take instructions from the Medical Officer of Health (MC) and implement the decisions.

Since the area of operation is about 500 sq.km., mosquito control operation can not be carried out from a central place which will involve considerable loss of time in moving men and material. Therefore eight sub-stations have to be located in such a way that 24 ranges could be covered efficiently. It is proposed that these substations should be located at the site of the Range Medical Office wherever they exist. Adequate transport facilities should be provided for efficient functioning of the programme. During the early stages, the then Commissioner of the BCC, Mr. M.B. Prakash, decentralized the operations at the suggestion of the VCRC and this system of fixing up responsibility for mosquito control on the Range Medical Officers was changed recently for unknown reasons. This was a retrograde step. Decentralization and delegating both authority and responsibility at lower levels are the key to efficient mosquito control.

Framing of the plan alone will not solve the mosquito problem unless and until it is implemented *in toto*. Therefore a time schedule should be strictly followed as detailed in the plan. It is not out of place to point out that the mosquitoes complete their aquatic life cycle within a period of 6 to 7 days in tropical conditions. Therefore it is desired that the programme should follow the same approach as that of a miltary operation which includes (1) ORGANISATION (2) LEADERSHIP (3) INFORMATION & FEEDBACK and (4) TACTICS & LOGISTICS. All these points were kept in mind while preparing this master plan. To make a plan dynamic, a certain flexible approach is necessary so that the concerned agency can modify the details as and when required in view of the changing mosquitogenic conditions. Only a broad outline on various control methods have been given and there is enough scope left for the local authorities to evolve methods for day to day implementations. The work schedule given in this plan is just to provide guidelines for logistic purposes.

A genuine campaign does not consist merely in the formation of expert committees, the passing of ordinances . . .; and the issue of wide advice to the public . . . it must always be permanent concern of the state, *requiring careful measurement of the amount of sickness present, a nice appreciation of measures most suitable for the locality, exact estimates of their cost compared with the cost of the disease, a well considered organization, and, above all, a fixed determination to succeed.*

RONALD ROSS, 1911.

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2. The successive Health Secretaries to the Govt. of Karnataka, and successive Commissioners of Bangalore Municipal Corporation.

3. Dr. C.R. Krishnamurthy, the Health Officer of Bangalore Municipal Corporation and Dr. Nazir Ahmed, Medical Officer of Health in charge of the mosquito control programme in Bangalore City Corporation.

The Centre is also grateful to the present and past Mayors for their cooperation.

The greatest obstacle to the future success of pest management is the attitude of people, growers, industry personnel and most important of all, applied research entomologist and extension personnel. It is not enough to just accept pest management concept and philosophy, they must be used. IPM is people oriented and in order for it to be put into general practice, the control specialist must use and demonstrate pest management technology and successfully teach it to others.

METCALF & LUCKMANN 1982.

Great is Sanitation, the greatest work, except discovery, I think, that a man can do.... What is the use of preaching high moralities, philosophies, policies and arts to people who dwell in.... appalling slums...? You must wipe away those slums, that filth, these diseases.... We shall reach the higher civilization, not by any of the politicians' shibboleths, methods of government, manners of voting, liberty, self-determination, and the rest, all of which have failed - but first by the scientific ordering of cities until they are fit for men of the higher civilization to dwell in. We must begin by being Cleansers.

— *Sir Ronald Ross*